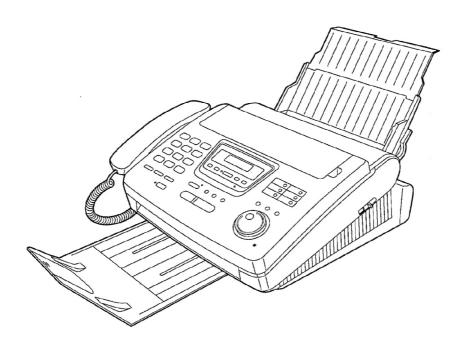
Service Manual

Compact Plain Paper FAX

KX-FP270

(for U.S.A.)



⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians.

Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

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INTRODUCTION

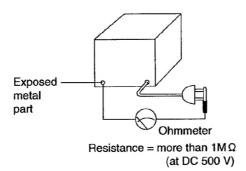
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SAFETY PRECAUTIONS

- 1. Before servicing, unplug the AC power cord to prevent an electric shock.
- 2. When replacing parts, use only the manufacturer's recommended components.
- 3. Check the condition of the power cord. Replace if wear or damage is evident.
- 4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
- 5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

INSULATION RESISTANCE TEST

- 1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
- 2. Turn on the power switch.
- 3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screwheads, control shafts, bottom frame, etc.).
 - Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
- 4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.



FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

- 1) Cover the plastic part's boxes with aluminum foil.
- 2) Ground the soldering irons.
- 3) Use a conductive mat on the worktable.
- 4) Do not touch the IC or LSI pins with bare fingers.

BATTERY CAUTION

CAUTION

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution:

Disposal of lithium batteries should be performed by permitted, professional disposal firms knowledgeable in state government federal and local hazardous materials and hazardous waste transportation and disposal requirements.

A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.

Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.

Recommend Type Number: CR2032 (BATT)

Manufactured by MATSUSHITA

CR2032 (BATT)

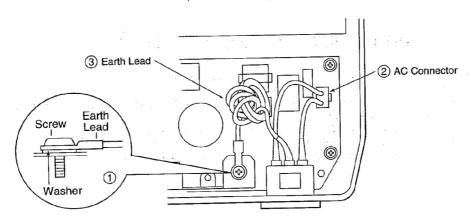
Manufactured by SONY

AC CAUTION

For safety, before closing the lower cabinet, please make sure of the following precautions.

- 1) The earth lead is fixed with the screw.
- (2) The AC connector is connected properly.
- $\widetilde{\ensuremath{\mathfrak{J}}}$ Wrap the earth lead around the core 3 times.

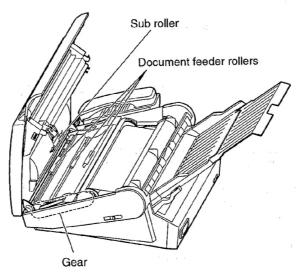
(BOTTOM VIEW)



PERSONAL SAFETY PRECAUTIONS

1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit. The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.



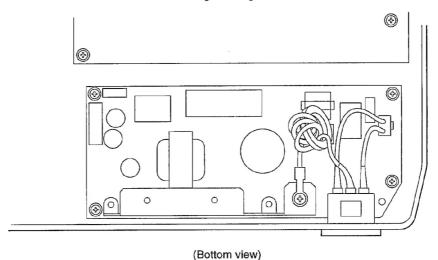
2. LIVE ELECTRICAL SECTIONS

All the electrical sections of the unit supplied with AC power by the AC power cord are live. Never disassemble the unit for service with the AC power supply plugged in.



AC voltage is supplied to the primary side of the power supply unit. Therefore, always unplug the AC power cord before disassembling for service.

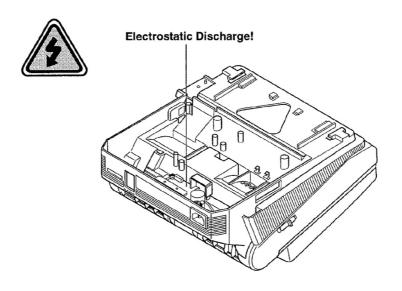
Be careful of "High Voltage" in this area.



SERVICE PRECAUTIONS

1. PRECAUTIONS TO PREVENT DAMAGE FROM STATIC ELECTRICITY

Electrical charges accumulate on a person. For instance, clothes rubbing together can damage electric elements or change their electrical characteristics. In order to prevent static electricity, touch a metallic part that is grounded to release the static electricity. Never touch the electrical sections such as the power supply unit, etc.



FEATURES

General

Help function

Display:

- 1. HOW TO SET UP
- 2. JOG/AUTO DIAL
- 3. TAD OPERATION
- 4. FAX SENDING
- 5. FAX RECEIVING
- 6. COPIER
- 7. Q and A
- 8. ERRORS
- 9. REPORTS
- 10. CALLER ID
- · LCD (Liquid Crystal Display) readout
- IQ-FAX™ (for U.S.A. only)

This feature can only be used by those who apply to the FaxSav service.

IQ-FAX is intelligent faxing which allows you to send faxes via the internet by using the IQ-FAX button. Behind the IQ-FAX button is the FaxSav Global Fax Network which manages the delivery of your fax to any fax machine in the world. It routes your fax via the best and most time efficient route and will automatically resend your fax for you, if the receiving fax machine is unavailable.

This "fax-only" network has the added advantage of cost efficiency due to the internet being integrated into the net work. Every fax is secure since the FaxSav net work utilizes the highest encryption legally allowed, ensuring that your documents stay secure. You get the benefits of carefree faxing with savings associated with the use of the internet. It is simple, quick, and secure.

Digital Answering System

- Voice Time/Day Stamp
- 18-Minutes recording time
- · Voice guidance for remote operation
- · Voice and fax paper call

Plain Paper Facsimile Machine

- 9 second transmission speed *
- 15 second transmission speed **
- · Letter/Legal, G3 compatible
- · Automatic document feeder (15 sheets)
- 10 stations one-touch dialer
- · Broadcast (up to 109 station)
- Resolution: Standard/Fine/Super fine/Half tone (64 level)
- · LCD Contrast : Normal/Darker
- · Delayed transmission
- Polling function
- · Overseas transmission function
- · Remote FAX receiving using an extension phone
- 150-sheet paper capacity
- Automatic fax/phone switching
- Distinctive ring detection ***
- High speed 14400 bps fax modem
- Out of paper reception (up to 28 papers) ****
- * The 9 second speed is based upon the CCITT No. 1 Test Chart on the condition that memory transmission is performed.
- ** The 15 second speed is based upon the CCIT No. 1 Test
- *** Subscription to distinctive ring services required.
- **** 350KB memory. Actual number of Pages depends upon the contents of the Pages and the resolution. 28-page capacity based upon CCITT No. 1 Test Chart at standard resolution.

Large Memory (28 pages) % Performed by DRAM

Approx. 28 pages of memory reception Approx. 25 pages of memory transmission

Integrated Telephone System

- On-hook dialing
- Digital duplex speakerphone
- Voice muting
- Redialing function
- 100-Station telephone directory with Jog Dial
- One-Touch dial (5x2 Phone Numbers)

Copier function

- Multi-copy function (up to 99 copies)
- Enlargement and reduction
- Collate
- 64-Level halftone
- Electronic film indicator

SPECIFICATIONS

These specifications are for the U.S.A.

version only.

Refer to the simplified manual (cover) for other areas.

Applicable Lines:

Public Switched Telephone Network

Document Size:

Max. 216 mm (81/2") in width

Max. 600 mm (235/4") in length

Effective Scanning Width:

208 mm (83/16")

Recording Paper Size:

Letter: 216×279 mm (81/2"×11") Legal: 216×356 mm (81/2"×14")

Effective Printing Width:

208 mm (83/16")

Transmission Time*:

Approx. 9 sec./page (Original mode)**

Approx. 15 sec./page (Original mode)*** Approx. 30 sec./page (G3 Normal mode)

Scanning Density:

Horizontal:

8 pels/mm (203 pels/inch)

Vertical:

3.85 lines/mm (98 lines/inch)—STANDARD mode 7.7 lines/mm (196 lines/inch)—FINE/HALF TONE mode 15.4 lines/mm (392 lines/inch)-SUPER FINE Mode

Halftone Level:

64-level

Scanner Type:

CCD Image Sensor

Printer Type:

Thermal Printing

Data Compression System: Modem Speed:

Modified Huffman (MH), Modified READ (MR)

Operating Environment:

14,400/12,000/9,600/7,200/4,800/2,400 bps; Automatic Fallback 5-35°C (41-95°F), 20-80 % RH(Relative Humidity)

Dimensions (H \times W \times D):

154×365×355 mm (61/16"×143/6"×1331/32")

Mass (Weight):

Approx. 4.85 kg (10.7 lb.)

Power Consumption:

Standby: Approx. 6.0 W Transmission: Approx. 14 W

Reception:

Approx. 37 W (When receiving a 20% back document) Approx. 48 W (When copying a 20% back document)

Copy: Maximum:

Approx. 160 W (When using a 100% back document)

Power Supply: Memory Capacity: 120 V AC, 60 Hz (This unit will not function at 50 Hz.)

Voice memory: Approx. 18 minutes of recording time including the greeting

message***

Fax memory: Approx. 28 pages memory reception

Approx. 25 pages memory transmission

(Based on CCITT No. 1 Test Chart in standard resolution.)

- * Transmission speed depends upon the contents of the pages, resolution, telephone line conditions and capability of the receiving unit.
- ** The 9 second speed is based upon the CCITT No. 1 Test Chart on the condition that memory transmission is performed. (Refer to next page.)
- *** The 15 second speed is based upon the CCITT No. 1 Test Chart . (Refer to next page.)
- **** Recording time may be reduced by the calling party's background noise.

Design and specifications are subject to change without notice.

OPTIONAL ACCESSORIES

Part No.	Description	Comment
KX-FA135	Film cartridge	1 cartridge & 1 film : 216 mm $ imes$ 100 m (8 $^{1}/_{2}$ " $ imes$ 328') roll (Prints approx. 330 letter size pages)
KX-FA136	Replacement film	2 films : 216 mm × 100 m (8 ½"×328') rolls (Prints approx. 660 letter size pages total)

CCITT NO. 1 TEST CHART (Actual size)



THE SLEREXE COMPANY LIMITED

SAPORS LANE - BOOLE - DORSET - BH 25 8 ER
TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC

18th January, 1972.

Dr. P.N. Cundall, Mining Surveys Ltd., Holroyd Road, Reading, Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

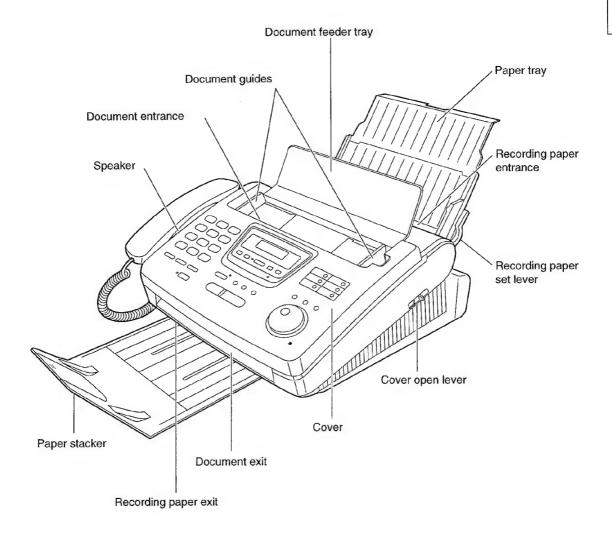
Yours sincerely,

P.J. CROSS

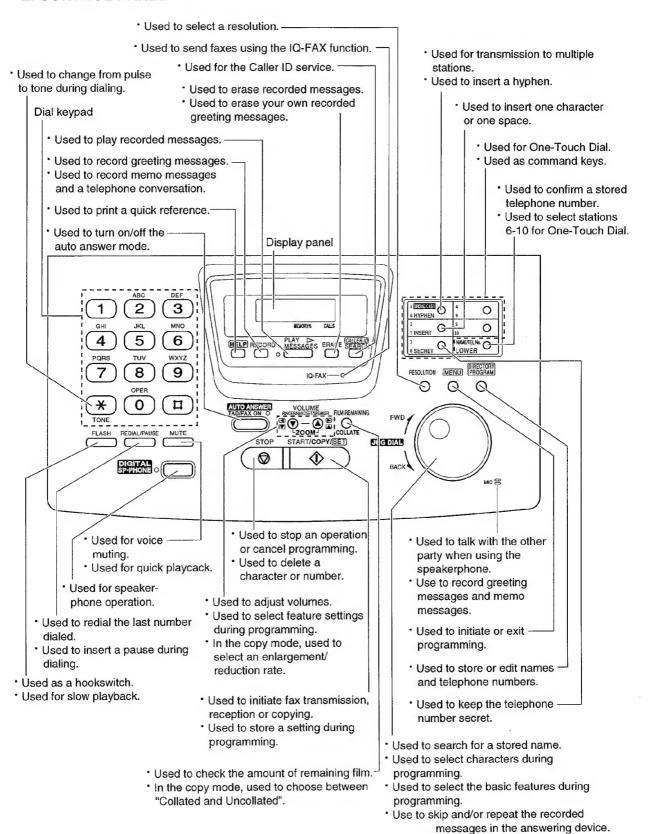
Group Leader - Facsimile Research

LOCATION OF CONTROLS

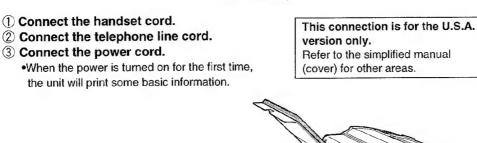
1. OVERVIEW

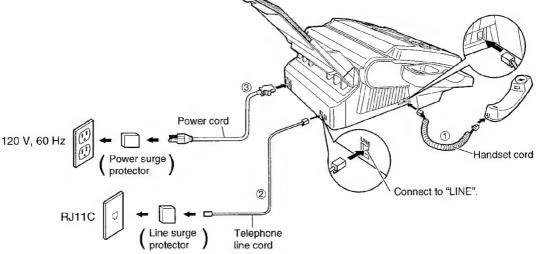


2. CONTROL PANEL



CONNECTIONS





Note:

- The warranty does not cover damage due to power line surges or lighting.
- For additional equipment protection, we recommend the use of a surge protector. The following types are available; TELESPIKE BLOK MODEL TSB (TRIPPLE MFG. CO.), SPIKE BLOK MODEL SK6-0 (TRIPPE MFG. CO.), SUPER MAX (PANAMAX) or MP1 (ITW LINX).
- When you operate this product, the power outlet should be near the product and easily accessible.
- If the following message is displayed when the unit is plugged in, the recording paper set lever is released.

Display: CHECK LEVER

Move the lever back.

Automatic dialing mode setting

• When the telephone line cord and the power cord are connected, the unit will automatically start to detec the dialing mode.

Display: CHECKING LINE

Wait until one of the following messages is displayed.

- If you line has touch tone service:

LINE IS TONE

- If you line has rotary pulse dial service:

LINE IS PLUSE

- If the power cord is desconnected or a power failure occure, the unit will detect the dialing mode again when power is restored.
- You can change the dialing mode setting manually by user mode.
- If you connect the power cord before connecting the telephone line cord, the following messages will be shown alternately.



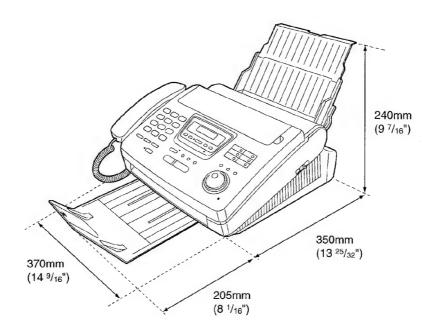
Connect the telephone line cord.

INSTALLATION

1. INSTALLATION SPACE

The space required to install the unit is shown below.

The dimensions given are necessary for the unit to operate efficiently.





Avoid excessive heat or humidity.

Use the unit within the following ranges of temperature and humidity.

Ambient temperature: 5℃ to 35℃

Relative humidity: 20% to 80% (without condensation)

Power cord length should be less than 5 meters (16.4 feet). Using a longer cord may reduce the voltage

or cause malfunctions.

Avoid direct sunlight.

Do not install near devices which contain magnets or generate magnetic fields.

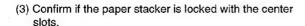
Do not subject the unit to strong physical shock or vibration.

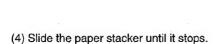
Keep the unit clean. Dust accumulation can prevent the unit from functioning properly.

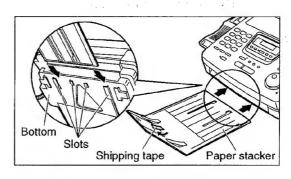
To protect the unit from damage, hold both sides when you move it.

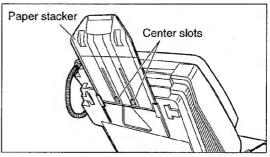
2. INSTALLING THE PAPER STACKER

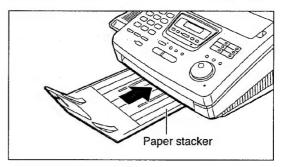
- (1) Remove the shipping tape from the paper stacker.
- (2) Lift the front of the unit and insert the paper stacker into the slots.





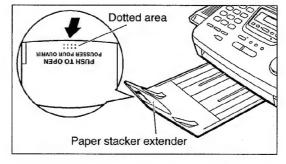




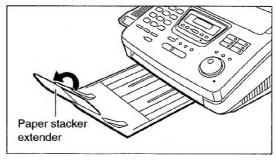


Using legal size paper

(1) Press the dotted area on the paper stacker extender.

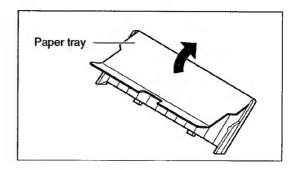


(2) Open the paper stacker extender.

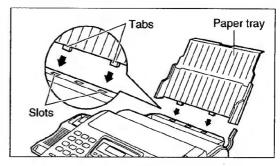


3. INSTALLING THE PAPER TRAY

(1) Open the paper tray.



- (2) Insert the two tabs on the paper tray into the slots on the back of the unit.
 - Do not place the unit in areas where the paper tray may be obstructed by a wall, etc.

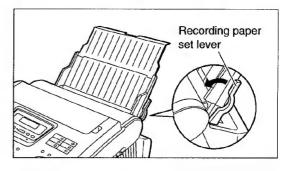


4. INSTALLING THE RECORDING PAPER

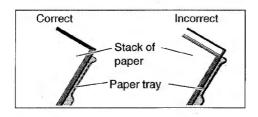
Letter or legal size recording paper can be loaded.

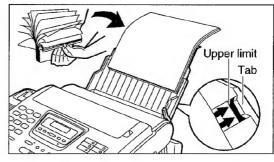
The paper tray can hold up to 150 sheets of 75 g/m² (20 lb.) paper. You may use 60 to 90 g/m² (16 to 24 lb.) paper. For best results, use inkjet paper like Hammermill[®] Jet Print. If you use other types of paper, the print quality may be affected.

(1) Pull the recording paper set lever forward.



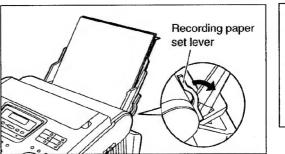
- (2) Fan the stack of paper to prevent a paper jam and insert the paper into the paper tray.
 - The height of the stack of the paper should not exceed the upper limit on the paper tray, otherwise a paper jam or multi-feed may occur.
 - The paper should not be over the tab.
 - If the paper is not inserted correctly, readjust the paper or a paper jam may occur.





Trademark: Hammermill[®] is a registered trademark of INTERNATIONAL PAPER in the United States and/ or other countries.

(3) Move the recording paper set lever back.



Note:

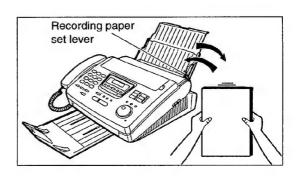
- Avoid paper with a cotton and/or fiber content that is over 20%, such as letterhead paper or those used for resumes.
- Do not use different types or thicknesses of paper in the paper tray at the same time. This may cause a paper jam.
- Avoid extremely smooth or shiny paper that is highly textured. Also avoid paper that is coated, damaged or wrinkled.
- · Avoid double-sided printing.
- Do not use paper printed from this unit for double-sided printing with other copiers or printers, or a paper jam may occur.

· Adding paper to the paper tray

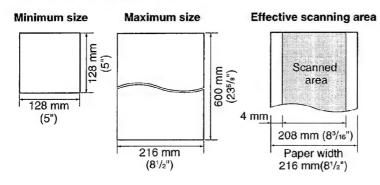
- 1. Pull the recording paper set lever forward.
 - The unit will beep and the following message is displayed.

Display: CHECK LEVER

- 2. Remove the installed paper.
- 3. Add paper to the removed paper and straighten it.
- 4. Fan the stack of paper and insert it into the paper tray.
- 5. Move the recording paper set lever back.



· Documents the unit can feed



Letter size Leagal size Leagal size 208 mm

Note:

- Remove clips, staples or other similar fastening objects.
- · Check that ink, paste or correction fluid has dried.
- Do not send the following types of documents. Use copies for fax transmission.
 - —Chemically treated paper such as carbon or carbonless duplication paper
- -Electrostatically charged paper
- -Heavily curled, creased or torn paper
- -Paper with a coated surface
- -Paper with a faint image
- —Paper with printing on the opposite side that can be seen through the front (e.g. newspaper)
- Only 15 sheets can be accepted at one time (60 to 75 g/m²). For a single sheet of 45 to 90 g/m², only one sheet can be accepted at one time.

Document weight

Single sheet:

45 to 90 g/m² (12 to 24 lb.)

Multiple sheets:

60 to 75 g/m2 (16 to 20 lb.)

Recording paper weight

60 to 90 g/m² (16 to 24 lb.) 75 g/m² (20 lb.)... up to 150 sheets

5. SETTING YOUR LOGO

The logo can be a company, division or name.

(1) Press MENU.

Display:

SYSTEM SET UP

(2) Press (#), then (0) (2).

YOUR LOGO

(3) Press (START/COPY/SET).

LOGO=

(4) Enter your logo, up to 30 characters, by using the dial keypad or (JOG DIAL).

For example, when entering "Bill" as your logo:

1. Press (2) twice.

LOGO=B

2. Press 4 six times.

LOGO=Bi

Cursor

3. Press (5) six times.

LOGO=Bil

 Press ► to move the cursor to the next space and press (5) six times.

LOGO=Bill

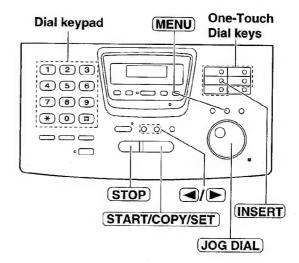
(5) Press (START/COPY/SET)

SYSTEM SET UP

(6) Press (MENU).

To insert a character

- 1. Use or to move the cursor to the position to the right of where you want to insert the character.
- 2. Press INSERT (One-Touch Dial key 2) to insert a space and enter the character.



To correct a mistake

• Use or to move the cursor to the incorrect character, then make the correction.

To delete a character

 Move the cursor to the character you want to delete and press (STOP).

To select characters with the dial keypad

Pressing the dial keys will select a character as shown below.

Key	/S							(Chara	cters								
	1	1	[]	{	}	+	-	1	==	,	•	_	ŧ	:	;	?	ı
	2	Α	В	С	а	b	С	2										
	3	D	Е	F	d	е	f	3										
	4	G	Н	1	g	h	i	4										
Dial	5	J	K	L	j	k	1	5										
Keys	6	М	N	0	m	n	0	6										
	7	Р	Q	R	S	р	q	r	s	7						,		
	8	V	U	Т	t	u	V	8										
	9	W	Х	Υ	Z	w	х	у	z	9								
	0	0	()	<	>	!	п	#	\$	%	&	¥	*	1	@	,	→
One-Touch	1 0	н	PHE	N key	(Used	d to in	sert a	hyph	en.)									
Dial keys	² O	IN	SERT	key (Used	to ins	ert on	ie cha	racter	or on	ie spa	ice.)						
Arrow																		
keys									ne righ		ber ke	ey, mo	ve the	e curs	or to	the ne	xt spa	ace.

Note:

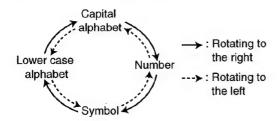
A hyphen entered in a telephone number is counted as two digits.

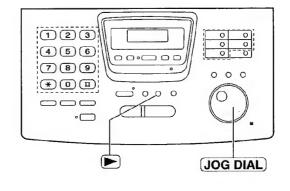
• To select characters using the JOG DIAL

Instead of pressing the dial keys, you can select characters using the JOG DIAL.

- 1. Rotate (JOG DIAL) until the desired character is displayed.
- 2. Press 🕟 to move the cursor to the next space.
 - •The character displayed in step 1 is inserted.
- 3. Return to step 1 to enter the next character.

Displayed order of characters





6. REPLACING THE FILM OR FILM CARTRIDGE

When the unit detects the end of the film, the following message will be displayed.

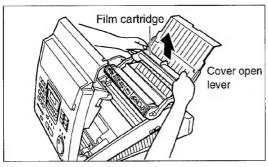
FILM NEAR EMPTY

The remaining film prints about 15 pages of letter size documents. Prepare a new film or film cartridge.

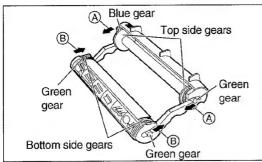
FILM EMPTY

The film is empty. Install a new film or film cartridge.

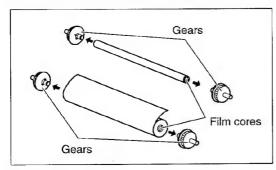
• For film and film cartridge information, refer to page 9.



- (1) Slide the cover open lever forward.
- (2) The cover is under tension to improve print quality. Pull up hard enough to open.
- (3) Remove the film cartridge.
 - If you have purchased a film cartridge (Part no. KX-FA135) for replacement, skip to step 10.
 - To replace only the film (Part no. KX-FA136), go to step 4.



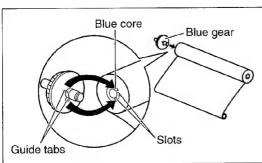
(4) Unlock the four gears by ((A)) pulling the top side gears (blue and green gears) forward and ((B)) pushing back the bottom side gears (green gears). Remove the used film.



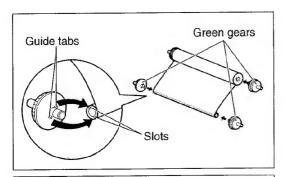
(5) Remove the four gears from the used film cores.

Caution:

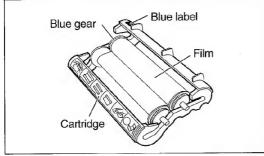
 The film is not reusable. You can order a new film for replacement through your nearest Panasonic dealer.



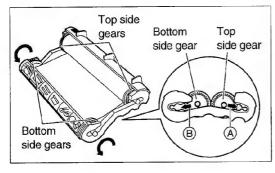
(6) Insert the blue gear into the blue core of the new film.



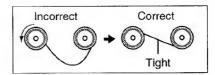
(7) Insert the three green gears into the remaining cores of the new film.

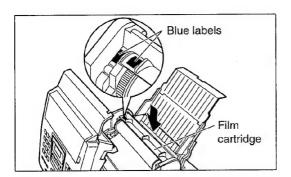


- (8) Insert the film into the cartridge so that the blue gear matches the blue label on the cartridge.
 - •The shiny side should be facing up.



- (9) Lock the four gears of the film by (A) pushing back the top side gears and (B) pulling the bottom side gears forward until they click into place.
 - If the film is slack, tighten it by winding the bottom side gears.





- (10) Insert the film cartridge by matching the blue label on the cartridge with the one on the unit.
- (11) Close the cover securely by pushing down on both corners.
 - The unit will check if the film is installed correctly.
 The following message will be displayed.

Display: PLEASE WAIT

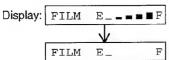
 If the following message is displayed, the film is not inserted correctly in the cartridge.

CHECK FILM

Reinsert it correctly.

•How much film you have left

To check the amount of remaining film, press **FILM REMAINING** while the unit is idle. The display indicates the approximate amount of remaining film.



When the film indicator points to this position, the remaining film will print up to 25 pages of letter size documents. Prepare a new film or film cartridge for replacement.

MAINTENANCE ITEMS AND COMPONENT LOCATIONS

1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

1) Periodic maintenance

Inspect the equipment periodically and if necessary, clean any contaminated parts.

2) Check for breakdowns

Look for problems and consider how they arose.

If the equipment can be still used, perform copying, self testing or communication testing.

3) Check equipment

Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.

4) Determine causes

Determine the causes of the equipment problem by troubleshooting.

5) Equipment repairs

Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur.

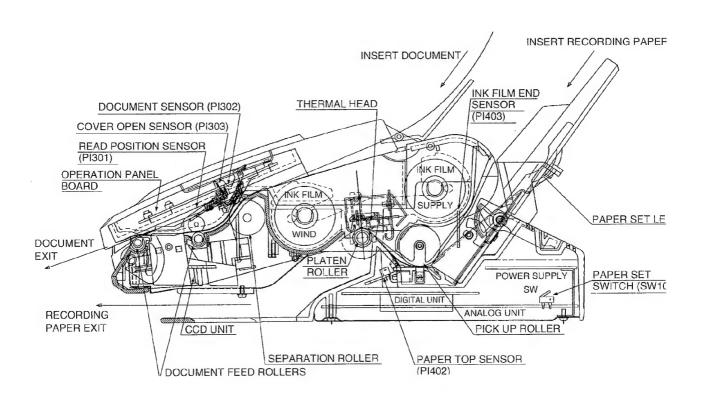
6) Confirm normal operation of the equipment

After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.

7) Record keeping

Make a record of the measures taken to rectify the problem for future reference.

2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS



2.1 MAINTENANCE LIST

NO.	OPERATION	CHECK	REMARKS
1	Document Path	Remove any foreign matter such as paper.	
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	See page 24.
3	Platen Roller	If the platen is dirty, clean it with a damp cloth then dry thoroughly.	
		Remove the paper and film cartridge before cleaning.	
4	Thermal Head	If the thermal head is dirty, clean the printing surface with a cloth	See pages 24
		moistened with denatured alcohol (alcohol without water), then dry	and 123.
		thoroughly.	
5	Target Glass, White Plate	If the target glass and white plate are dirty, clean the glass with a soft dry cloth.	See page 24.
6	Sensors	Document sensor (Pl302), Read position sensor (Pl301), Hook switch	See pages 22
		(SW401), Paper top sensor (Pl402), Film end sensor (Pl403), Cover	or 87, and 157.
		open sensor (Pl303) and Paper set switch (SW101). Confirm the	
		operation of the sensors.	
7	Mirrors and Lens	If the mirrors and lens are dirty, clean them with a soft dry cloth.	
8	Abnormal, wear and	Replace the part.	
	tear or loose parts	Check if the screws are tight on all parts.	
			. *

2.2 MAINTENANCE CYCLE

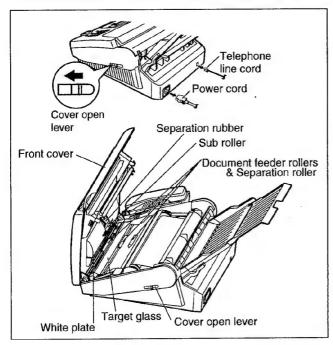
	Cleaning		Replacement		
Item	Cycle Procedure		Cycle	Procedure	
Separation Roller	3 months	See p. 24.	7 years	See p. 129.	
(Ref. No. 142)			(100,000 documents)		
Separation Rubber	3 months	See p. 24.	7 years	See p. 124.	
(Ref. No. 59)		·	(100,000 documents)		
Feed Rollers	3 months	See p. 24.	7 years	See p. 130.	
(Ref. No. 135,139)			(100,000 documents)		
Target Glass, White plate	3 months	See p. 24.	7 years	See p. 198, 202	
(Ref. No. 201,56)			(100,000 documents)		
Thermal Head	3 months	See p. 24.	7 years	See p. 123.	
(Ref. No. 69)			(100,000 documents)		
Platen Roller	3 months	See p. 130.	7 years	See p. 130.	
(Ref. No. 133)			(100,000 documents)		
	Separation Roller (Ref. No. 142) Separation Rubber (Ref. No. 59) Feed Rollers (Ref. No. 135,139) Target Glass, White plate (Ref. No. 201,56) Thermai Head (Ref. No. 69) Platen Roller	Item Cycle Separation Roller 3 months (Ref. No. 142) Separation Rubber 3 months (Ref. No. 59) Feed Rollers 3 months (Ref. No. 135,139) Target Glass, White plate (Ref. No. 201,56) Thermal Head 3 months (Ref. No. 69) Platen Roller 3 months	Item Cycle Procedure Separation Roller (Ref. No. 142) Separation Rubber (Ref. No. 59) Feed Rollers (Ref. No. 135,139) Target Glass, White plate (Ref. No. 201,56) Thermal Head (Ref. No. 69) Platen Roller 3 months See p. 24.	Item Cycle Procedure Cycle Separation Roller (Ref. No. 142) 3 months See p. 24. 7 years (100,000 documents) Separation Rubber (Ref. No. 59) 3 months See p. 24. 7 years (100,000 documents) Feed Rollers (Ref. No. 135,139) 3 months See p. 24. 7 years (100,000 documents) Target Glass, White plate (Ref. No. 201,56) 3 months See p. 24. 7 years (100,000 documents) Thermal Head (Ref. No. 69) 3 months See p. 24. 7 years (100,000 documents) Platen Roller 3 months See p. 130. 7 years	

These values are only standard ones and may vary depending on usage conditions.

3. MAINTENANCE

3.1 CLEANING THE DOCUMENT FEEDER UNIT

If misfeeding occurs frequently or if dirty patterns or black bands appear on a copied or transmitted document, clean the document feeder rollers, sub roller, separation rubber flap, white plate and target glass.

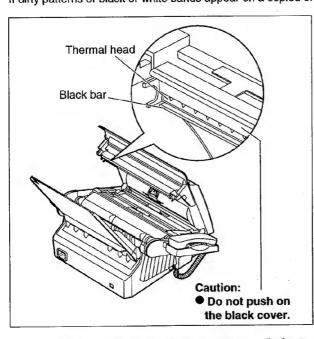


- (1) Disconnect the power cord and telephone line cord.
- (2) Slide the cover open lever forward to unlock the cover.
- (3) The cover is under tension to improve print quality. Pull up hard enough to open.
- (4) Clean the document feeder rollers, sub roller, separation rubber and separation roller with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly.
- (5) Clean the white plate and the target glass with a soft dry cloth.
- (6) Close the cover securely by pushing down on both corners.
- (7) Connect the power cord and telephone line cord.

Caution: Do not use paper products, such as paper towels or tissues, to clean the inside of the unit.

3.2 CLEANING THE THERMAL HEAD AND BLACK BAR

If dirty patterns or black or white bands appear on a copied or received document, clean the thermal head and black bar.



- (1) Disconnect the power cord and telephone line cord.
- (2) Slide the cover open lever forward.
- (3) The cover is under tension to improve print quality. Pull up hard enough to open.
- (4) Clean the thermal head and black bar with a cloth moistened with isopropyl rubbing alcohol, and let dry thoroughly.
- (5) Close the cover securely by pushing down on both corners.
- (6) Connect the power cord and telephone line cord.

Caution: To prevent a malfunction due to static electricity, do not use a dry cloth and do not touch the thermal head directly with your fingers.

3.3 CLEANING THE PICK UP ROLLERRefer to page 129.

TROUBLESHOOTING GUIDE

		Page					
1. Trouble	shooting Summary	26					
1.1	Troubleshooting	26					
1.2	Precautions	26					
1.3	When you don't know how to	,					
	operate the unit, use the Help function	26					
2. User Re	ecoverable Errors	27, 28					
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3.3	Troubleshooting Items Table	30					
4. Program	4. Programming and Lists 92~104						
5. Test Fu	nctions	105~110					

1. TROUBLESHOOTING SUMMARY

1. 1 TROUBLESHOOTING

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

1. 2 PRECAUTIONS

- If there is a problem with the print quality or the paper feed, first check if the installation space and the print
 paper meets the specifications, the paper selection lever/paper thickness lever is set correctly, and the paper is
 set correctly without any slack.
- 2) Before troubleshooting, first check that the connectors and cables are connected correctly (not loose). If the problem occurs randomly, check it very carefully.
- 3) When connecting the AC power cord with the unit and checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.
- 4) After troubleshooting, double check that you have not forgotten any connectors, left any loose screws, etc.
- 5) Always test to verify that the unit is working normally.

1. 3 WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION

- How to use: 1. Press (HELP).
 - 2. Press (A) or (T) until the desired item is displayed.
 - 3. Press START/COPY/SET).

2. USER RECOVERABLE ERRORS

If the unit detects a problem, one or more of the following messages will appear on the display.

DISPLAY MESSAGE	CAUSE AND REMEDY
CALL SERVICE	There is something wrong with the unit. Contact our service personnel. [This error is displayed when the thermal head does not warm up. Check the thermistor on the thermal head and connector lead. (for technicians)]
CHECK COVER	• The cover is open. Close it.
CHECK DOCUMENT	The document is not fed into the unit properly. Reinsert the document. If misfeeding occurs frequently, clean the document feeder rollers and try again. If the problem remains, adjust the feeder pressure. (Refer to page 113.)
CHECK FILM	The film cartridge is not inserted properly. Reinsert it correctly.
CHECK LEVER	• The recording paper set lever is released. Push it back to set the lever.
CHECK MEMORY	Memory (telephone numbers, parameters, etc.) has been erased. Re-program. [The backup battery on the top of the digital board may be low or dead, so check it.]
CHECK PAPER	 The recording paper is not installed or the unit ran out of paper. Install paper. The recording paper is not fed into the unit properly or has jammed near the recording paper entrance. Clear the jammed paper. Do not install folded or heavily curled paper in the paper tray.
FAX IN MEMORY	• The unit has (a) document(s) in memory. See the other message's instructions to print out the document(s).
FAX MEMORY FULL	 Memory is full of received documents due to lack of recording paper or a recording paper jam, etc. Install paper or clear the jammed paper. When performing memory transmission, the document being stored exceeds the memory capacity of the unit. Transmit the entire document by using manual or automatic transmission.
FILM EMPTY	The film is empty. Replace the film or film cartridge with a new one. The film is slack. Tighten it and install again.
FILM NEAR EMPTY	The remaining film can print about 15 pages of letter size documents. Prepare a new film or film cartridge.
FREE FILM EMPTY	The free starter film is empty. Replace the film or film cartridge with a new one.
JOG-DIAL FULL	There is no space to store new stations in the JOG DIAL directory. Edit or erase unnecessary stations.
LOADING ERROR	 A loading error occurred while receiving IQ-data from faxsav®. This service is only available in the United States. [Refer to page 8 for details on the faxsav® service.]
MESSAGE FULL	There is no room left in memory to record a voice message. Erase some of all of the messages.
NO FAX REPLY	The other party's fax machine is busy or ran out of recording paper. Try again.
PAPER JAMMED	A recording paper jam occurred under the film cartridge. Clear the jammed paper. [If the printout jams, please refer to Fig. a on the next page.]

Trademark

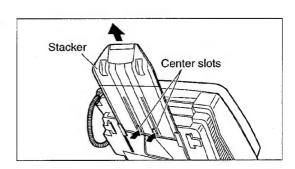
faxsav is a registered trademark of FaxSav Incorporated.

DISPLAY MESSAGE	CAUSE AND REMEDY
PLEASE WAIT	The unit is checking if the film is set correctly. Wait for a while.
REDIAL TIME OUT	The other party's fax machine is busy or ran out of recording paper. Try again.
REMOVE DOCUMENT	The document is jammed. Remove the jammed document. Attempted to transmit a document longer than 600 mm (23 ⁵ / _g .). Press the STOP button to remove the document. [Alternately, turn off service code #559 to enable sending of documents longer than 600 mm.]
TRANSMIT ERROR	A transmission error occurred. Try again.
UNIT OVERHEATED	The unit is too hot. Let the unit cool down. [If many copies are nearly all black, this message will be displayed. When this occurs, open the front cover and let the unit cool down.]
NO TEL LINE	Refer to page 13.

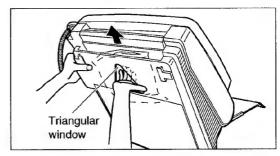
*The explanations given in the [] are for servicemen only.

Remove the jammed paper as follows.

① First, lift the front of the unit. Pull the stacker forward until it stops, then press the center slots to unlock and remove the stacker.



② Tilt the unit up and push the jammed recording paper out through the triangular window on the bottom of the unit.



③ Remove the jammed recording paper from the recording paper exit.

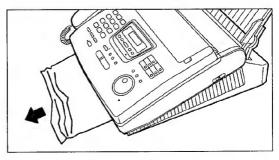


Fig. a

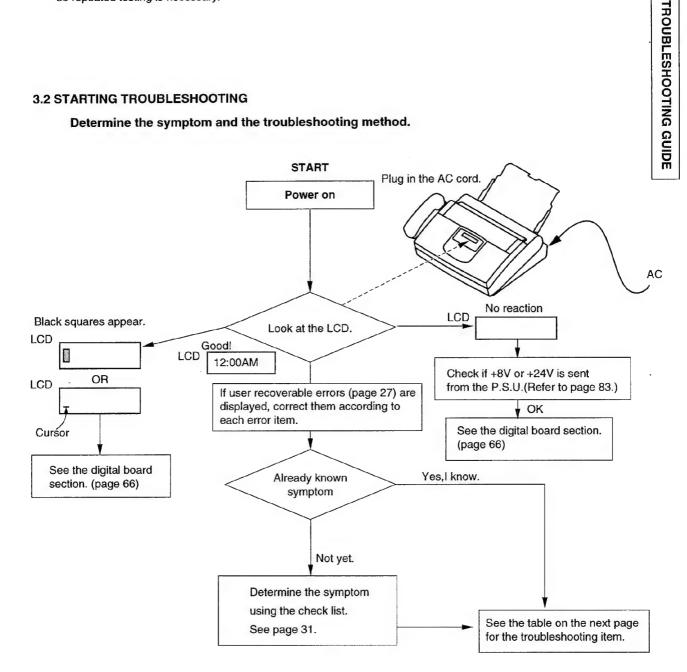
3. TROUBLESHOOTING DETAILS

3.1 OUTLINE

Troubleshooting is for recovering quality and reliability by determining the broken component and replacing, adjusting or cleaning it as required. First, determine the problem then decide the troubleshooting method. If you have difficulty finding the broken part, determine which board is broken. (For example: the Digital PCB, Analog PCB, etc.) The claim tag from a customer or dealer may use different expressions for the same problem, as they are not a technician or engineer. Using your experience, test the problem area corresponding to the claim. Also, returns from a customer or dealer often have a claim tag. For these cases as well, you need to determine the problem. Test the unit using the simple check list on page 31. Difficult problems may be hard to determine, so repeated testing is necessary.

3.2 STARTING TROUBLESHOOTING

Determine the symptom and the troubleshooting method.



3.3 TROUBLESHOOTING ITEMS TABLE

ITEM	SYMPTOM	SEE THIS PAGE.	
	The document does not feed.	32	
ADF	Document jam	33	
(Auto Document Feeder)	Multiple feed	34	
	Skew	35	
	The recording paper does not feed.	36	
Recording paper feed	Paper jam	37	
	Multiple feed and skew	37	
	The sent fax data is skewed.	38	
	The received fax data is skewed.	38	
	The received or copied data is expanded.	38	
P 1 11	A blank page is copied.	39	
Printing	A blank page is received.	41	
	Black or white vertical line	41	
	Black or white lateral line	42	
	An abnormal image is printed.	43	
	Cannot communicate by fax.	44	
Communication	An error code is displayed.	44	
FAX, TEL	Cannot talk.	78	
(analog board)	The DTMF tone doesn't work.	78	
(analog boars)	The handset/monitor doesn't work, etc.	78	
Operation panel	Keys are not accepted.	86	
Sensor	If the electric circuit is the cause, the error message corresponding to the sensor will be displayed.	87	

3.3.1 Simple Check List

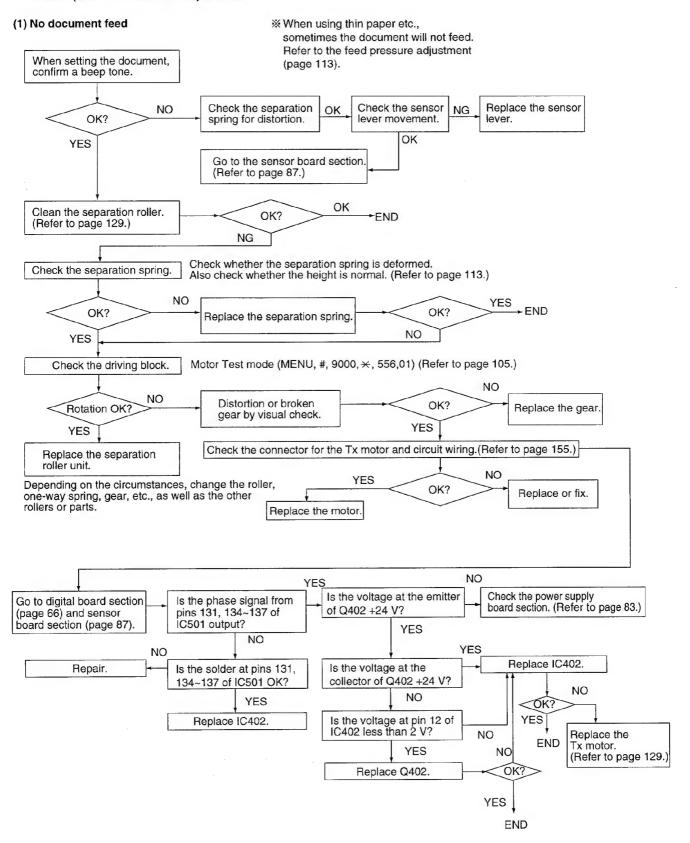
SERIAL NO.

DATE

ī	FUNCTION	JUDGEMENT	REFERENCE
	Transmission	OK/NG	
FAX operaton	Receiving	OK / NG	
Copy operation		OK / NG	
	Handset transceiver/ receiver	OK/NG	
	SP-PHONE sound	OK/NG	
Telephone operation	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
	VOX detection	OK / NG	Service code 815*
	Key check	OK / NG	Service code 561*
Operation panel	LED check	OK / NG	Service code 557*
	LCD check	OK / NG	Service code 558*
Sensor	Sensor check	OK/NG	Service code 815*
Clock	Sensor check	OK / NG	Is the time kept correctly? Check with another clock.
Digital Speaker phone		OK / NG	
Digital TAM	Greeting Rec/Play	OK / NG	
	Incoming message Rec/Play	OK / NG	
	Memo Rec/Play	OK / NG	
Voice prompt		OK / NG	SERVICE CODE 784 Check whether voice prompt is play or not.

^{**}Check according to the service code referring to the Test function on page 105.

3.3.2 ADF (Auto document feed) section



(2) Document JAM

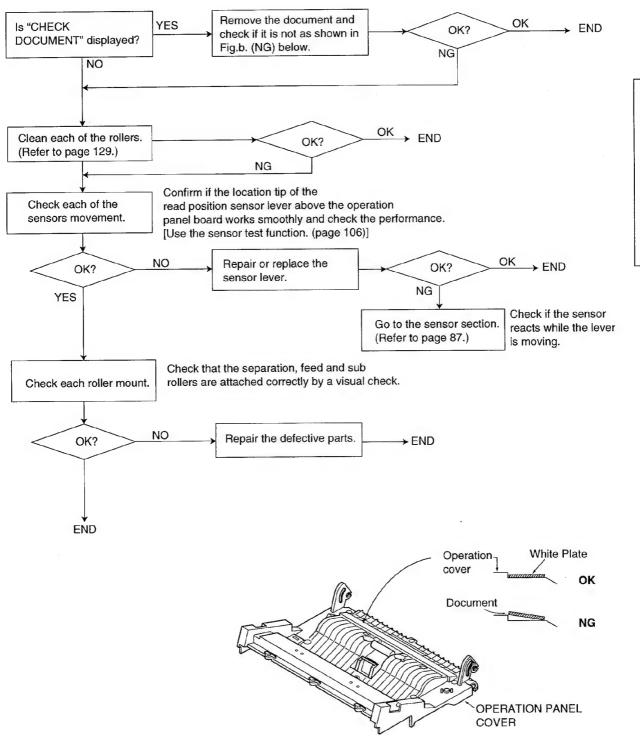
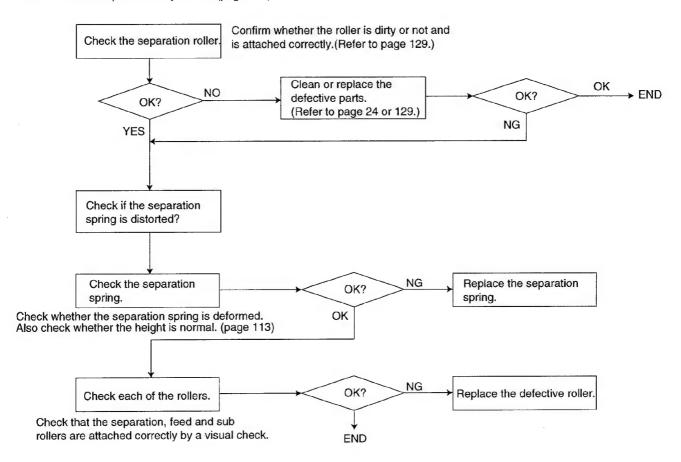


Fig. b

(3) Multiple feed

When using thick paper etc., sometimes the document will not feed.
 Refer to the feed pressure adjustment (page 113).



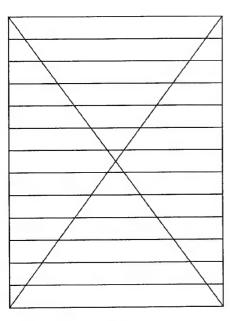
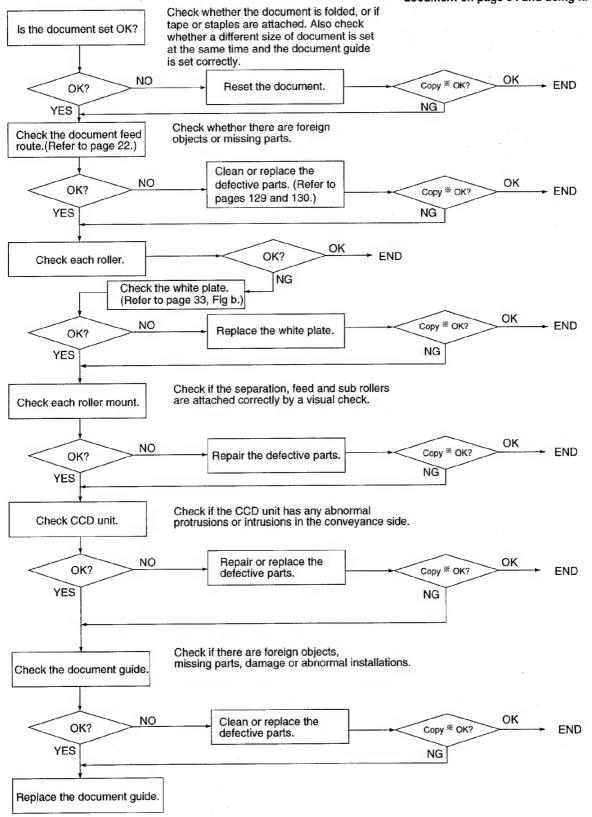


Fig. A

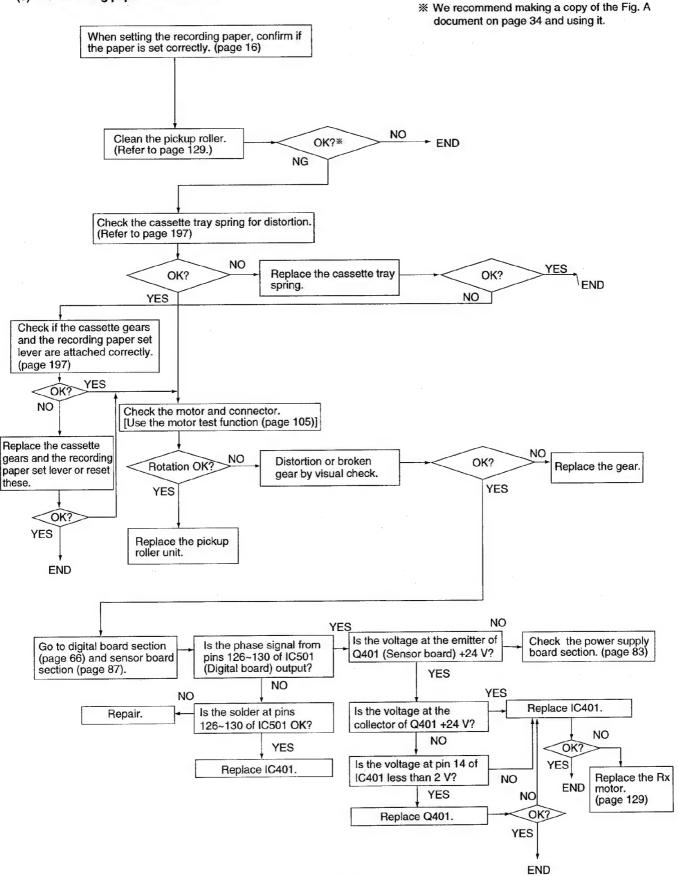
When confirming if the characters are extended or distorted on, it the feed problem is occurred, use this kind of test chart.

(4) Skew

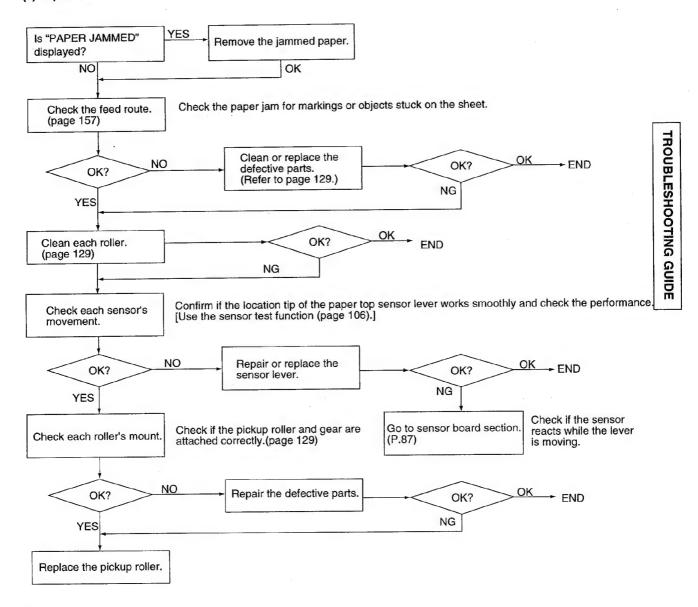
** We recommend making a copy of the Fig. A document on page 34 and using it.



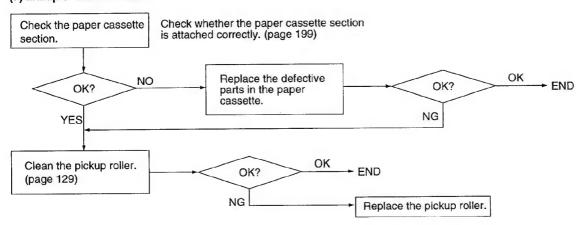
(5) The recording paper does not feed.



(6) Paper JAM



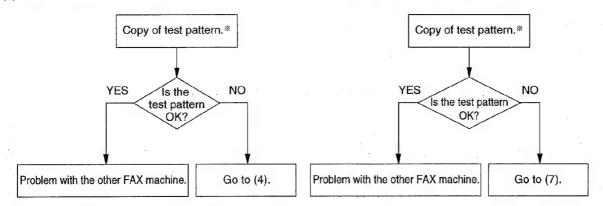
(7) Multiple feed and skew



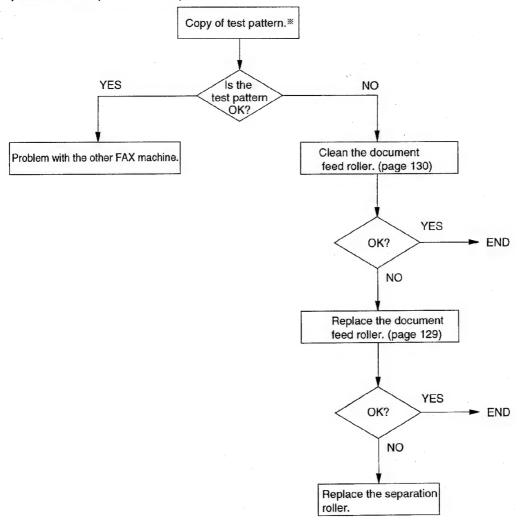
* We recommend making a copy of the Fig. A document on page 34 and using it.

(8) The sent fax data is skewed.

(9) The received fax data is skewed.

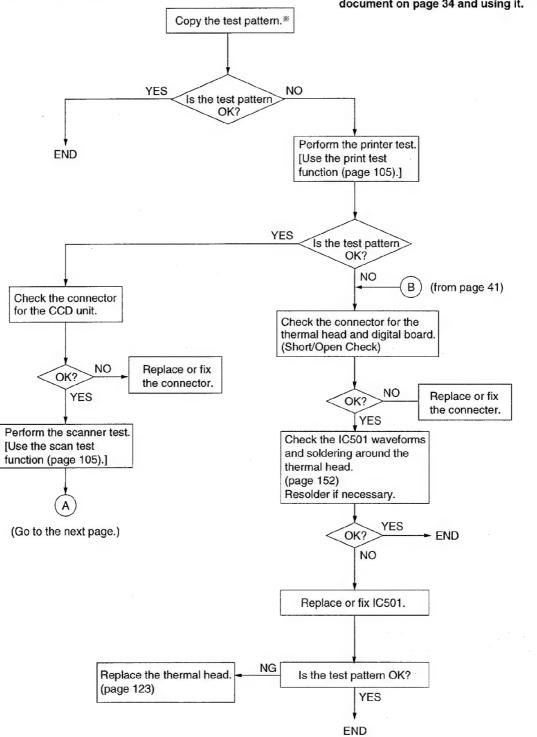


(10) Received or copied data is expanded.



(11) A blank page is copied.

* We recommend making a copy of the Fig. A document on page 34 and using it.



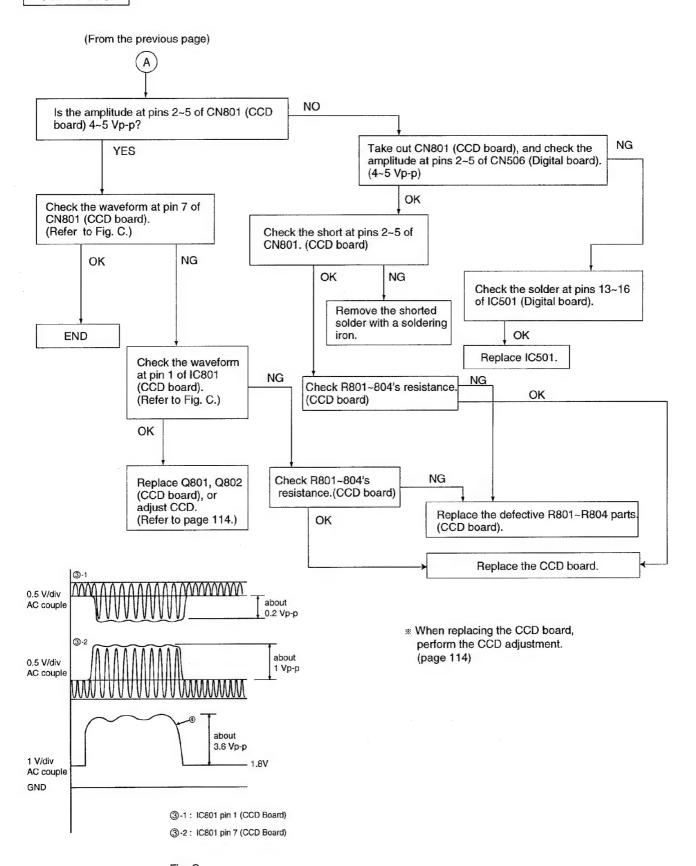
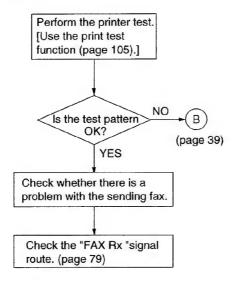
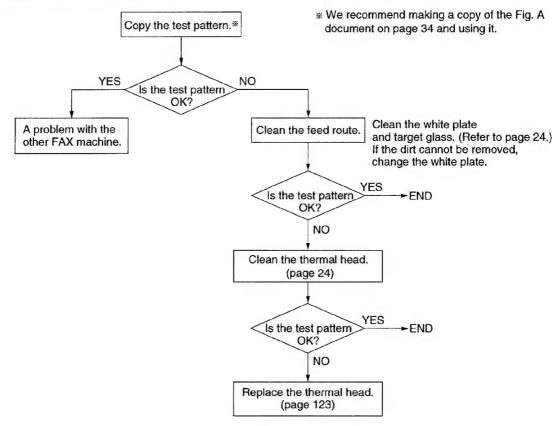


Fig. C

(12) A blank page is received.

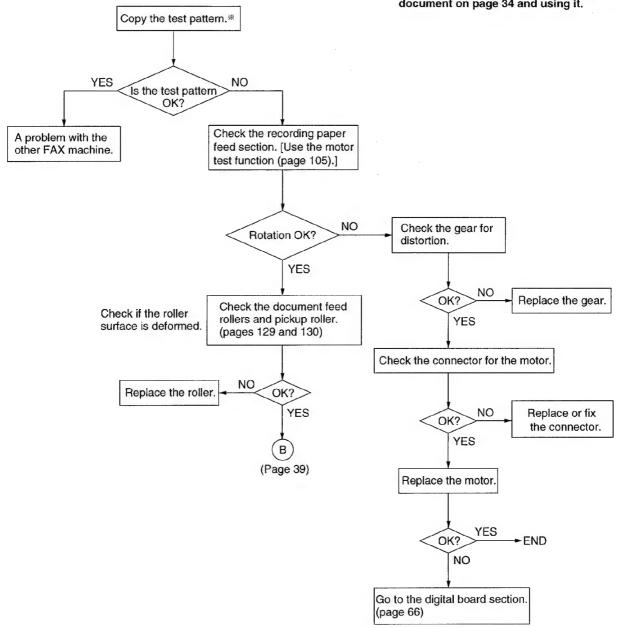


(13) Black or white vertical line



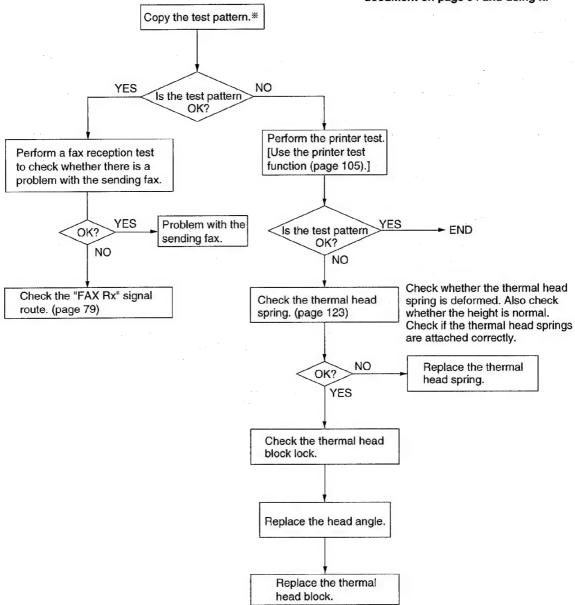
(14) Black or white lateral line on print out

* We recommend making a copy of the Fig. A document on page 34 and using it.



(15) An abnormal image is printed.

* We recommend making a copy of the Fig. A document on page 34 and using it.



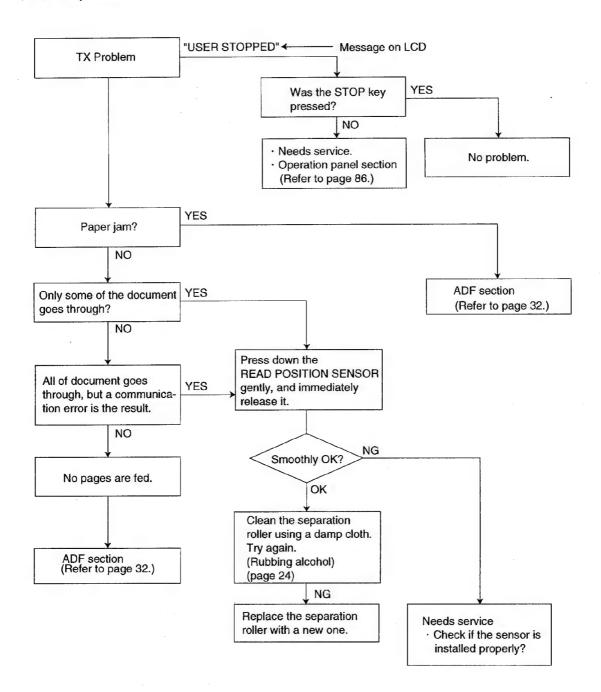
3.3.3 Communication Section

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in the reference pages (P45 - P61).

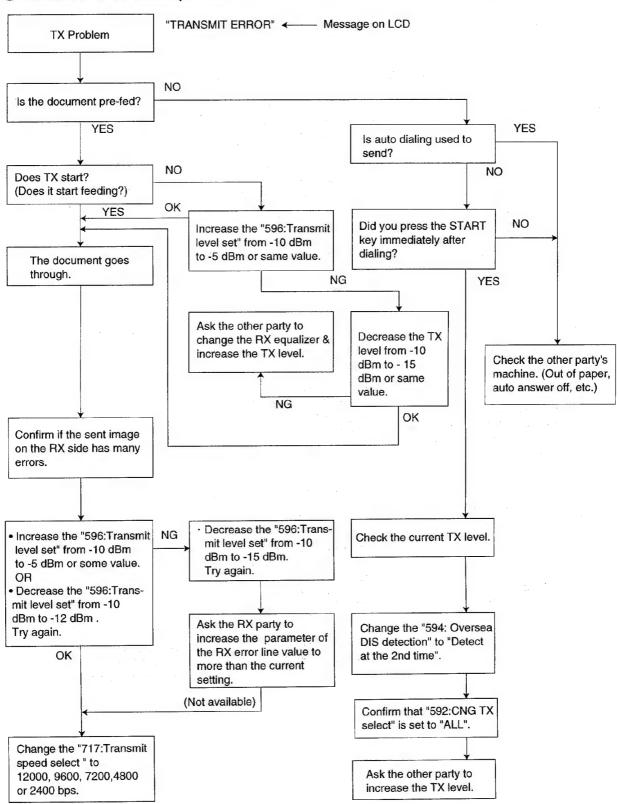
No.	Symptom	Ref. page	Content	Possible cause
1	The paper does not feed properly when faxing. (Copying is also not possible.)	p. 45	Troubleshooting	Problem with the feeding mechanism.
2	The fax transmits successfully one time and fails another. (Copying is also possible.)	p. 46	Troubleshooting	Problem with the service line or with the receiver's fax.
3	The fax receives successfully one time and fails another. (Copying is also possible.)	p. 47	Troubleshooting	Problem with the service line or with the transmitter's fax.
4	The fax completely fails to transmit or receive. (Copying is also possible.)	p. 49	Troubleshooting	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or international call. (Copying is also possible.)	p. 50 ~ p. 52	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	The fax image is poor when transmitting or receiving during a long distance or international call.	p. 52	,	
7	No.1-No.5	p. 53 ~ p. 61	The troubleshooting procedure for each error code will be printed on the communication result report.	

1) Defective facsimile section

①Transmit problem



②Sometimes there is a transmit problem.

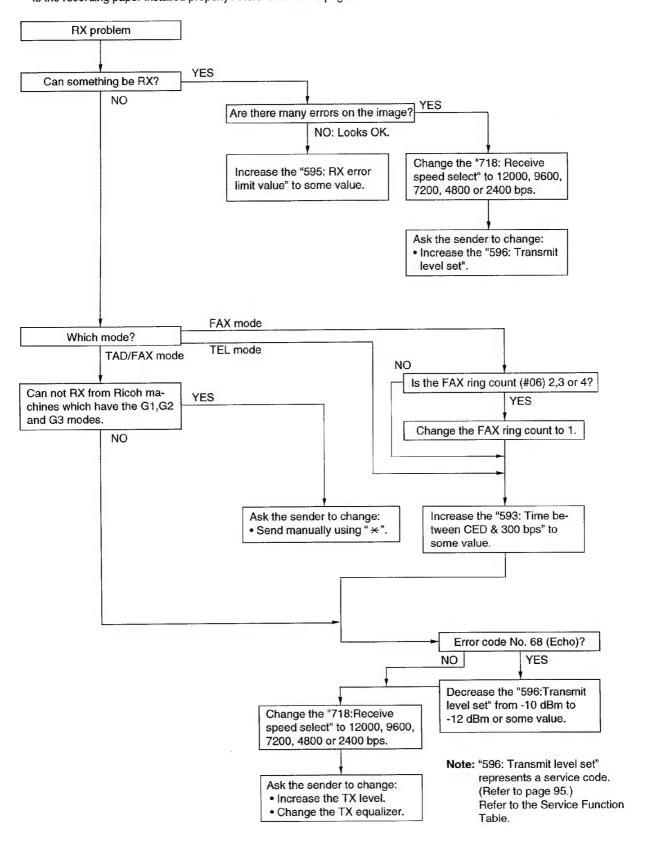


Note: "596: Transmit level set" represents a service code. (Refer to page 95.) Refer to the Service Function Table.

③ Receive problem

Confirm the following before starting troubleshooting.

• Is the recording paper installed properly? Refer to the next page.

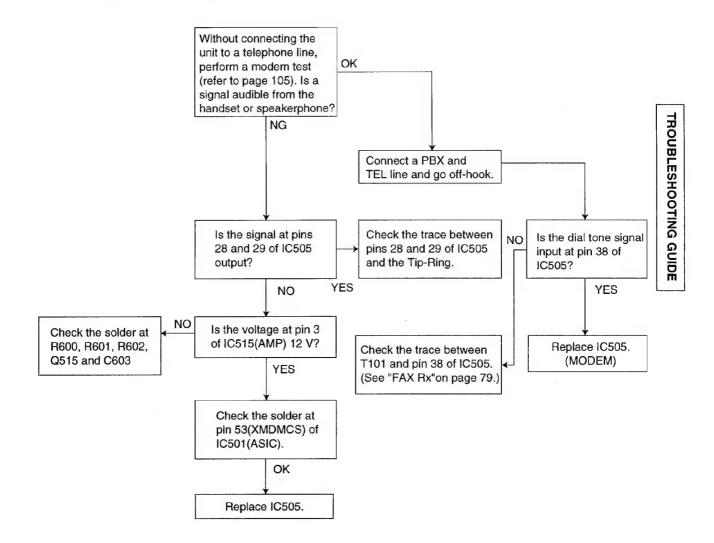


For the receiving problem, we have thought of causes other than in the software. Some causes may be when the fax changes to the memory receiving mode (for example, when out of paper), and the memory becomes full of the unprinted fax data. In this case, [MEMORY FULL] and its main cause (for example, "CHECK PAPER") are displayed on the LCD. Accordingly, by solving the main problem, [MEMORY FULL] can be canceled and the receiving problem can be resolved. The causes of the display errors are shown below.

CHECK PAPER
CHECK COVER
FILM EMPTY
UNIT OVERHEATED (COVER OPEN, etc., it is necessary to reset the unit.)
PAPER JAMMED
CHECK FILM

Please refer to "2. User Recoverable Errors" (refer to page 27) for the above items. Also, when it actually becomes a hardware deformity, please check each sensor. (Refer to page 106.)

4 The unit can copy, but cannot transmit/receive.



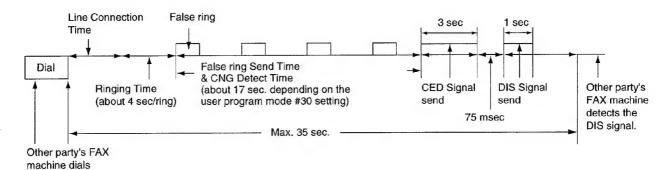
⑤ The unit can copy, but cannot either transmit/receive long distance or international communications.

The following 2 causes can be considered for this.

Cause 1

The other party is executing automatic dialing, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to CED or DIS.) (According to the ITU-T standard, the communication procedure is stopped when there is no response from the other party within 35 sec, so that the other party releases the line.)

(Response Time)



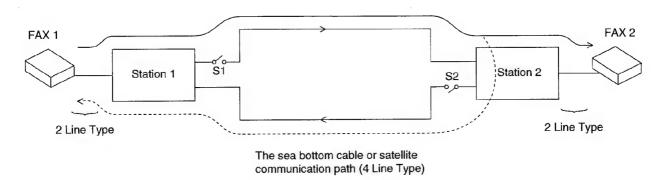
(Cause and Countermeasure)

As shown in the chart above, the total handshaking time must be reduced, but because of the long distance connection and linking of several stations, the line connection time cannot be reduced. Accordingly, the following countermeasures should be tried.

(A) As the 35 sec. count is started directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time can be delayed for 2 pauses (about 10 sec.).

Cause 2:

Erroneous detection because of an echo or an echo canceler.



(Echo/Echo Canceler)

The signal from FAX1 reaches FAX2 via stations 1 and 2, but the reflection signal at station 2 also returns via station 1 (echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 at a max of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is also a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1 and station 2) attaches echo cancelers (S1 and S2) for international lines or long distance lines. For the echo canceler, the level of the transmission signal from FAX1 is compared with the level of the reception signal from FAX2. When the transmission signal is larger, S1 is closed while S2 is opened when it is smaller. In other words, for transmission from FAX1, S1 is closed and S2 is open, so that the echo does not return to FAX1.

(Causes and Countermeasures)

(Cause A)

When a training signal is transmitted from FAX1 during the communication procedure at the time of transmission from FAX1 to FAX2, there is a delay until the echo canceler operates. S1 is closed so that a part of the head of the training signal may drop out. Normal reception by FAX2 may not be possible, and transmission may not be started.

(Countermeasure A)

When the international line mode is ON in the service mode (code No. 521), a dummy signal is attached to the head of the training signal to prevent this problem. As this normally is ON, it is necessary to reconfirm that this has not become OFF. When the international mode is switched OFF, the transmission side will try the training signal three times at each speed (9600BPS, 4800BPS and 2400BPS). If NG, it will drop the speed by one rank (fall-back). When the international mode is switched ON, each speed will be tried only twice. In other words, the slower speed with fewer errors can be accessed more easily. This is done because the line conditions may deteriorate and the picture may be disturbed more easily during communication for international lines or long distance communication, even when the training is OK. The default value is ON as preference is given to clearer pictures rather than speed.

(Cause B)

The echo canceler operation is stopped with a 2100Hz signal. (i.e. S1 and S2 become ON).

Accordingly, when FAX1 has executed automatic reception, a CED signal is output. If this signal is 2100Hz, S1 and S2 will become ON. Then the echo of the DIS signal output afterwards may be received and FAX1 may execute an erroneous operation, preventing communication from starting.

(Countermeasure B)

In the service mode, the CED signal frequency is set to 1100 Hz (code No.520), or the time setting between the CED signal and the DIS signal is set from 75 msec to 500 msec in the service mode (code No.593). This is because the echo canceler operation stop mode is canceled by an interval of 250 msec or more.

(Cause C)

This model is FAX1 and the other party is FAX2.

For transmission from this model to FAX2, FAX2 executes automatic reception and transmits a CED signal (2100 Hz) followed by a DIS signal. As the echo cancelers stops as described in cause B, the echo of the DIS signal returns to FAX2. On the other hand, this model detects the DIS signal and transmits a DCS signal. In other words, it is possible that the echo of the DIS signal and the DCS signal transmitted from this model reach FAX2 one after the other. FAX2 defect an error and communication is not started.

(Countermeasure C)

When the international DIS detection setting is set in the service mode (code No.594), this model does not respond to the first DIS signal and returns a DCS signal only for the second DIS signal.

In other words, there is an interval of 250 msec between transmission of the first and second DIS signal so that the echo cancelers operation recovers. An echo is not generated for the second DIS signal.

Note:

When the other FAX does not respond with a DCS signal after DIS signal transmission, the DIS signal is transmitted three times for trial.

Summary:

Long distance and international communication operations

SYMPTOM	COUNTERMEASURE		
Does not receive in the automatic mode.	 If possible, manual transmission should be done from the transmission side. If possible, two pauses should be inserted at the end of the auto dial number on the transmission side. If possible, the Function Selector Switch should be switched to FAX. 		
Does not transmit.	 Confirm the international line mode is ON. (Service mode: code No. 521) Enable the international DIS detection setting. (Service mode: code No. 594) 		
Does not receive.	Set the time setting between the CED signal and the DIS signal to 500 msec. (Service mode: code No. 593) Set the CED frequency to 1100Hz. (Service mode: code No. 520)		

(a) The unit can copy, but the transmission and reception image are incorrect. (Long distance or international communication operation)

This widely depends on the transmission and reception capability of the other FAX unit and the line conditions. The countermeasures for this unit are shown below.

Transmission Operation:

Set the transmitting speed to 4800BPS (service mode: code No. 717) or select the overseas mode.

Reception Operation:

If 80% or more of the reception is incorrect, set the receiving speed to 4800BPS. (Service mode: code No. 718)

· Refer to page 92 for the service mode's code setting.

7 How to output the Journal Report:

- 1. Press the MENU button.
- 2. Press "#", then " 2 " and " 2 ".
- 3. Press the START/COPY/SET button.
- 4. Press ▼ or ▲ to select the desired setting.

Sample of a journal report

JOURNAL Jan. 20 1998 01:19PM *CODE NO. OTHER FACSIMILE START TIME PAGES RESULT USAGE TIME MODE Jan. 20 01:18PM 00'51 COMMUNICATION ERROR (43)01 2345678 SND SND: Sent directly. (2) Communication (1) Error code IQ-FAX: Sent to the message fax server. (Refer to page 8)

5. Press the START/COPY/SET button.

6. The report prints out.

Error code table:

RCV:Received directly

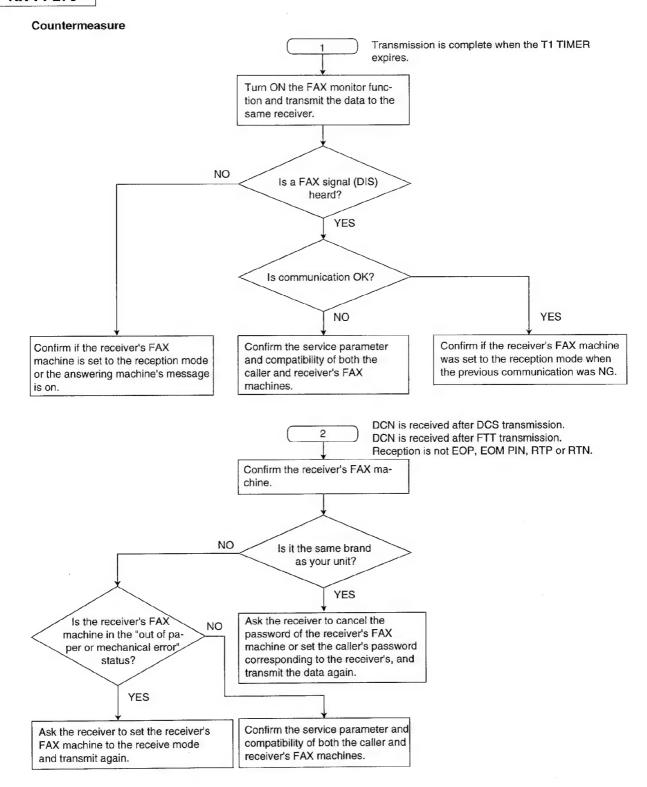
(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Counter- measure (go to the next page)
	PRESSED THE STOP KEY	TX & RX	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	TX	The document paper is jammed.	
	NO DOCUMENT	TX	No document paper.	
	THE COVER WAS OPENED	TX & RX	The cover is open.	
40	NO RESPONSE	TX	Transmission is finished when the T1 TIMER expires.	1
41	COMMUNICATION ERROR	TX	DCN is received after DCS transmission.	2
42	COMMUNICATION ERROR	TX	FTT is received after transmission of a 2400BSP training signal.	3
43	COMMUNICATION ERROR	TX	No response after post message is transmitted three times.	4
44	COMMUNICATION ERROR	TX	RTN and PIN are received.	5
46	COMMUNICATION ERROR	RX	No response after FTT is transmitted.	6
48	COMMUNICATION ERROR	RX	No post message.	7
49	COMMUNICATION ERROR	RX	RTN is transmitted.	8
50	COMMUNICATION ERROR	RX	PIN is transmitted (to PRI-Q).	8
51	COMMUNICATION ERROR	RX	PIN is transmitted.	8
52	NO RESPONSE	RX	Reception is finished when the T1 TIMER expires.	9
54	ERROR-NOT YOUR UNIT	RX	DCN is received after DIS transmission.	11
58	COMMUNICATION ERROR	RX	DCN is received after FTT transmission.	13
59	ERROR-NOT YOUR UNIT	TX	DCN responds to the post message.	14
65	COMMUNICATION ERROR	TX	DCN is received before DIS reception.	2
65	COMMUNICATION ERROR	RX	Reception is not EOP, EOM PIP, PIN, RTP or RTN.	2
68	COMMUNICATION ERROR	RX	No response at the other party after MCF or CFR is transmitted.	13
70	ERROR-NOT YOUR UNIT	RX	DCN is received after CFR transmission.	13
72	COMMUNICATION ERROR	RX	Carrier is cut when the image signal is received.	16
75	MEMORY FULL	RX	The document was not received due to memory full.	
79	CANCELED	TX	The multistation transmission was rejected by the user.	
FF	COMMUNICATION ERROR	TX & RX	Modem error. For the DCN, DCN, etc. abbreviations, refer to "5. Modem Section" on page 162.	12

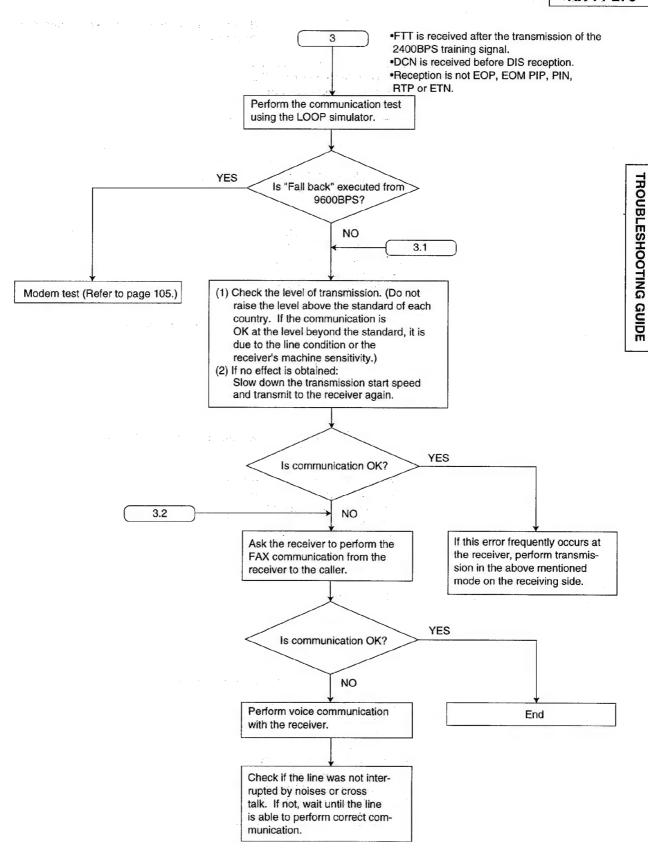
TX=TRANSMISSION RX=RECEPTION

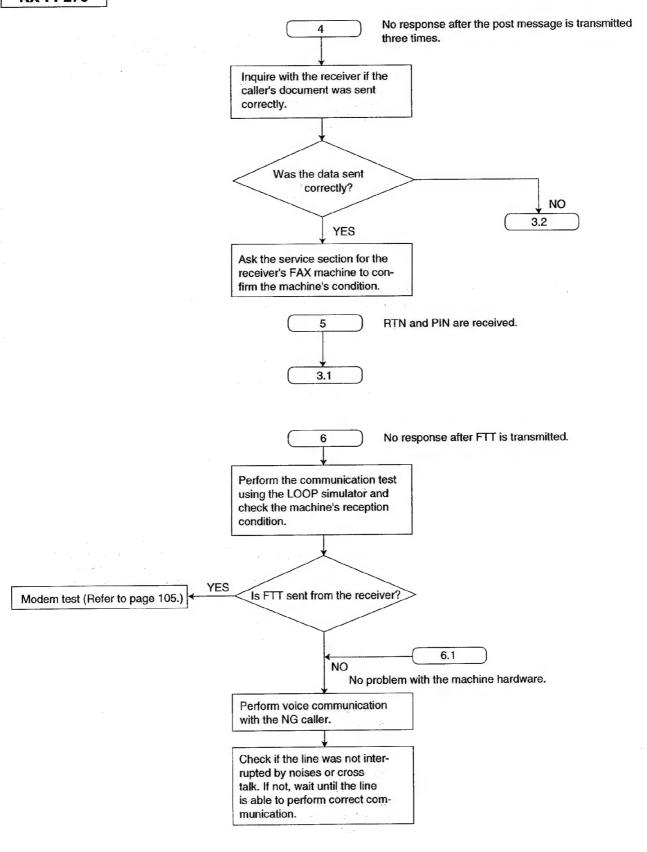
*Most fax communication problems can be resolved by the following steps.

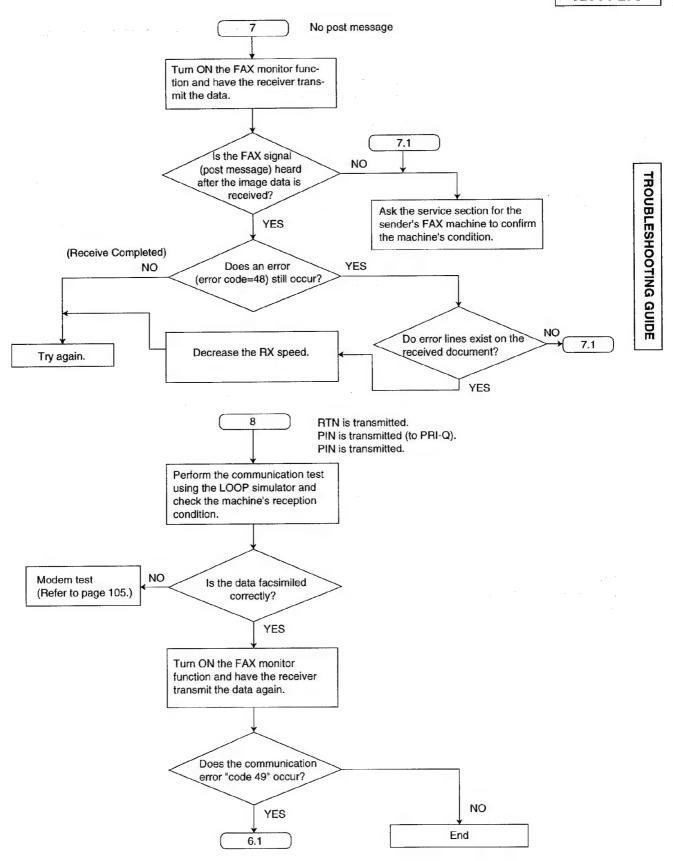
- 1) Change the transmit level. (Service code: 596, refer to page 95.)
- 2) Change the TX speed/RX speed. (Service code: 717/718, refer to page 95.)

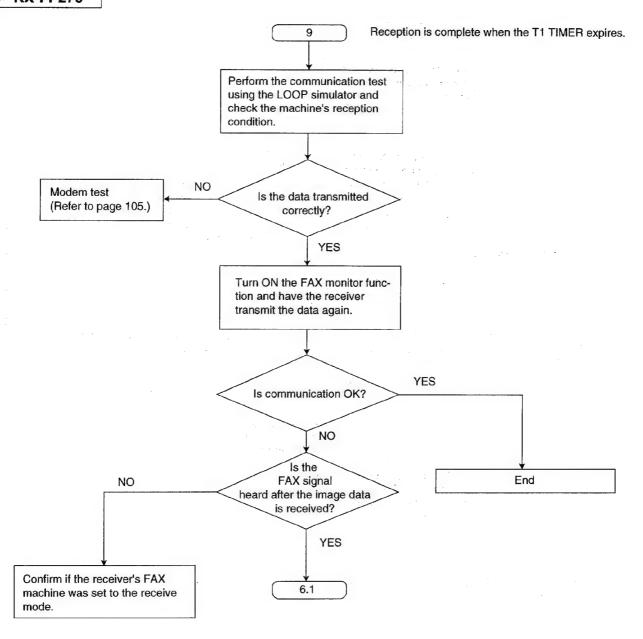
If the problem remains, see the next page.

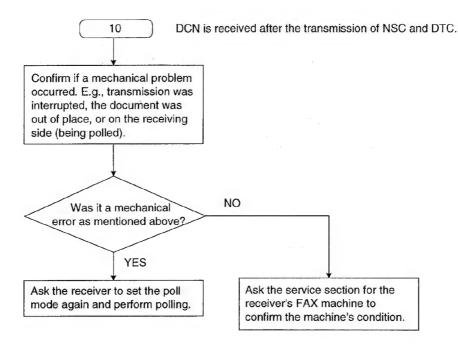


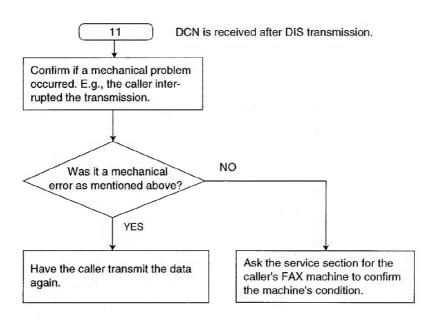


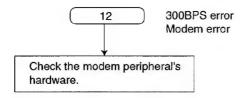


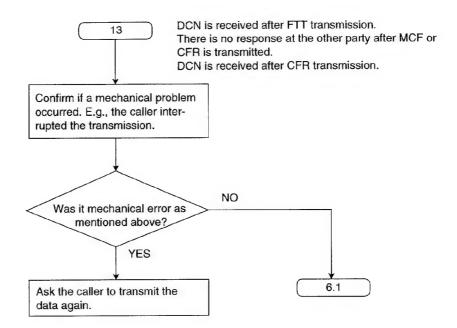


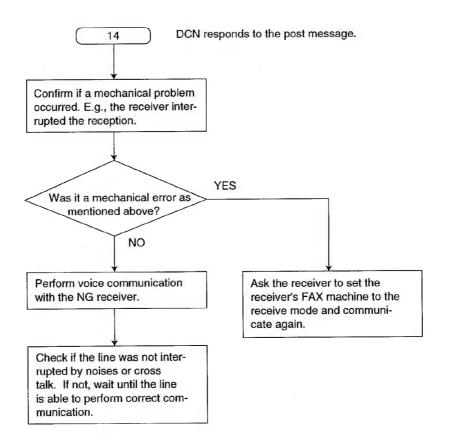


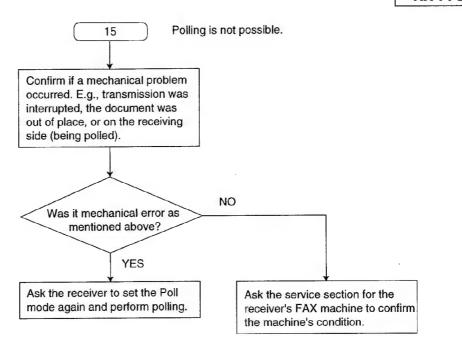


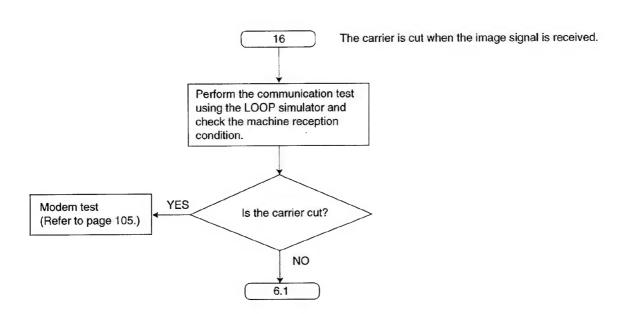












2) Remote programming

If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (② Program mode table: refer to page 64). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, out put the setup list (code: 991) and service list (code: 999) from the customer's fax machine.

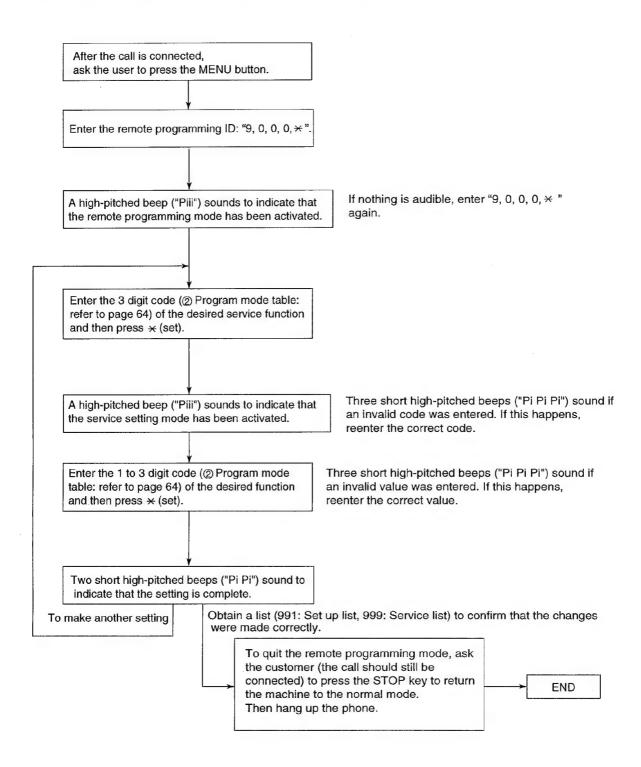
Based on this, the parameters for the desired codes can be changed.

The procedure for changing and listing parameters is described on the next page. Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that only the desired parameters were changed.

Hint:

Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone. This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

(1) Entering the remote programming mode and changing service codes



② Program Mode Table

Code	Function	Set Value	Default	Remote Setting
001	Set date and time	mm/dd/yy hh:mm	Jan/01/98	NG
002	Your logo		None	NG
003	Your telephone number		None	NG
004	Transmission report mode	1:Error / 2:ON / 3:OFF	Error	ОК
	FAX ring count	1~4	2	OK
006	TAD/FAX ring count	1~4/TOLL SAVER/RINGER OFF	2	OK
	Not available in TEL/FAX mode			OK
010	Recording time	1:VOX/2:MIN	VOX	ОК
011	Remote ANS ID	4	ID=111	NG
013	Dialing mode	1:Pulse / 2:Tone / 3:Auto	Auto	OK
	Memory XMT	1:ON / 2:OFF	OFF	OK
022	Auto journal print	1:ON / 2:OFF	ON	ОК
023	Overseas mode	ON/OFF	OFF	NG
025	Delayed transmission	ON/OFF	OFF	NG
	Auto caller list	1:ON / 2:OFF	ON	OK
026			3	OK
030	Silent FAX recognition ring	3 to 6 rings	OFF	OK OK
031	Distinctive ring	1:OFF / 2:A / 3:B / 4:C / 5:D		
036	Rx reduction	1:92% / 2:86% / 3:72% / 4:OFF	92%	OK OK
039	LCD contrast	1:Normal / 2:Darker	Normal	OK OK
040	Silent detection	1:ON / 2:OFF	ON ID 110	OK NO
041	Remote FAX activation code	ON / OFF	ON ID=*9	NG
042	Message alert	1:ON /2:OFF	OFF	OK
043	REC. time alert	1:ON /2:OFF	OFF	OK
044	Receive alert	1:ON / 2:OFF	ON	OK
046	Friendly receive	1:ON / 2:OFF	ON	OK
047	FAX voice guidance	1:ERROR/2:ON/3:OFF	ON	ОК
054	Common greeting MSG. REC. time	1:16s/2:60s	16s	ОК
060	Message transfer	MESSAGE/PAGER/OFF	OFF	NG
061	Transfer greeting	CHECK/RECORD ERASE	CHECK	NG
067	ICM monitor	1:ON / 2:OFF	ON	OK
070	FAX Pager	ON / OFF	OFF	NG
075	IQ-FAX	1:ON / 2:OFF	OFF	OK
076	FAX tone	1:ON / 2:OFF	ON	OK
077	Auto answer mode	1:TAD/FAX 2: FAX Only 3:TEL/FAX	TAD/FAX	OK
078	TEL/FAX ring	1 to 4 rings	2	OK
079	Film detection	1:ON / 2:OFF	ON	ОК
080	Set default	YES / NO	NO	NG
501	Pause time set	001~600 x 100msec	050	ОК
502	Flash time set	01~99 x 10msec	70	ОК
503	Dial speed	1:10pps / 2:20 pps	10pps	ОК
510	Vox time	1:6sec / 2:4sec	6sec	OK
520	CED frequency select	1:2100Hz / 2:1100Hz	2100	OK
520	International mode select	1:ON /2:OFF	ON	OK
	Auto standby select	1:ON / 2:OFF	ON	OK
522		1:0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
523	Receive equalizer select Transmission equalizer select	1:0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
524	Setting the number of times that message	1.0MII / 2.1.0MII / 3.3.0MII / 4.7.2MII	OKIII	
533	transfere is redialed.	00~99	03	OK
	Setting of the message transfer/pager call	001~999	030	OK
534	redial interval			
	redial interval Memory clear			NG
550	Memory clear			NG NG
550 551	Memory clear ROM check			
550 551 552	Memory clear ROM check DTMF signal tone test	ON / OFF	OFF	NG NG
550 551	Memory clear ROM check			NG

Code	Function	Set Value	Default	Remote Setting
	Motor test			NG
557	LED test			NG
558	LCD test			NG
559	Document jam detection	1:ON / 2:OFF	ON	OK
	Key test			NG
563	CCD position adjustment	00~30		OK
570	Break % select	1:61% / 2:67%	61%	OK
	ITS auto redial time set	00~99	14	OK
	ITS auto redial line disconnection time set	001~999sec	30	OK
573	Remote turn-on ring number	01~99	15	OK
580	TAM continuous tone detection	1:ON / 2:OFF	ON	OK
590	FAX auto redial time set	00~99	05	ОК
591	FAX auto redial line disconnection time set	001~999sec	045	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300 bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection	1:1st / 2:2nd	1st	ОК
595	Receive error limit value	001~999	100	ОК
596	Transmit level set	-15~00dBm	-10	OK
598	Receiving Sensitivity	20~48	43	ОК
599	ECM frame size	1:286 byte / 2:64 byte	256 byte	ОК
602	Warning list printing	1:ON /2:OFF	ON	ОК
002		1:14400/ 2:12000/ 3:9600/ 4:7200/		ОК
717	Transmit speed select	5:4800/ 6:2400	14400bps	
718	Receive speed select	1:14400/ 2:12000/ 3:9600/ 4:7200/ 5:4800/ 6:2400	14400bps	ОК
740		1:ON /2:OFF	ON	ок
719	Ringer off in TEL/FAX mode	1:ON / 2:OFF	ON	OK
721	Pause tone detect	1:ON / 2:OFF	ON	OK OK
722	Redial tone detect	1:A /2:B /3:OFF	A	OK OK
731	CPC mode	1:350ms / 2:1800ms / 3:OFF	350msec	OK OK
732	Auto disconnect Power on film feed	1:ON /2:OFF	ON	OK
745		1:10s / 2:20s / 3:30s	20s	OK OK
763	CNG detect time for friendly reception T1 timer	1:35s / 2:60s	35s	OK OK
771	Monitoring of message transfer	1:ON /2:OFF	OFF	OK
775		1:Start	OH	NG NG
784	Voice prompt			NG
815	Sensor & VOX test	1:SP-Phone		NG
841	Digital SP-Phone RX & TX check			NG
852	Print test pattern	1.0		OK
	Top margin	1~9		
854	Left margin	1~8	OFF	OK OK
861	A4 size set	1:ON / 2:OFF	OFF	A CONTRACTOR OF THE PARTY OF TH
880	History list	1:Start		NG
881	Journal 2	1:Start		NG
882	Journal 3	1:Start	ON	NG
890	TEL/FAX ring back tone	1:ON / 2:OFF	ON	OK
991	Setup list	1:Start		OK
994	Journal list	1:Start		OK
995	Journal 2 list	1:Start		OK
996	Journal 3 list	1:Start		OK
998	History list	1:Start		OK
999	Service list	1:Start		OK

Note: Refer to page 94 for descriptions of the individual codes.

OK means "can set". NG means "can not set".

For example, the "004 Transmission report mode" set value "1:ERROR/2:ON/3:OFF" number corresponds to the number dialed.

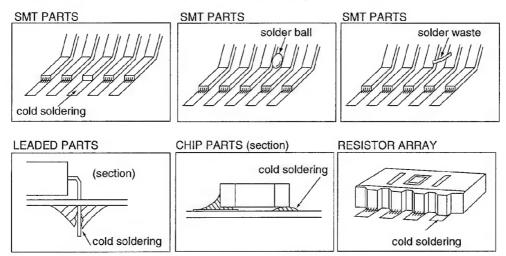
3.3.4 Digital board section

One of most difficult problems to deal with is when the system will not boot up.

The symptom: No response when the power is turned on. (No LCD display, keys are not accepted.)

Then first thing to do is check the power source. If there is no problem with the power supply unit, then there is a problem with the digital unit (main board).

As there are many potential causes in this case (ASIC, DRAM, etc.), it may be difficult to specify what you should check first. If a mistake is made in the order of checks, a normal part may be determined faulty, wasting both time and money. Although the tendency is to regard the problem as a serious one (IC malfunction, etc.), usually most cases are caused by solder faults (poor contact due to a tunnel in the solder, signal short circuit due to solder waste).



Note:

- 1. Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.
- 2. Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.

Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially SRAM, DRAM and ROM) malfunctions are extremely rare after installation in the product.)

This may be repaired by replacing the IC, (DRAM etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead.

Soldering faults difficult to detect with the naked eye are common, particularly for ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines.

Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved.

An explanation of the main signals (for booting up the unit) is below.

Don't exchange ICs or stop repairing until checking the signal lines.

An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

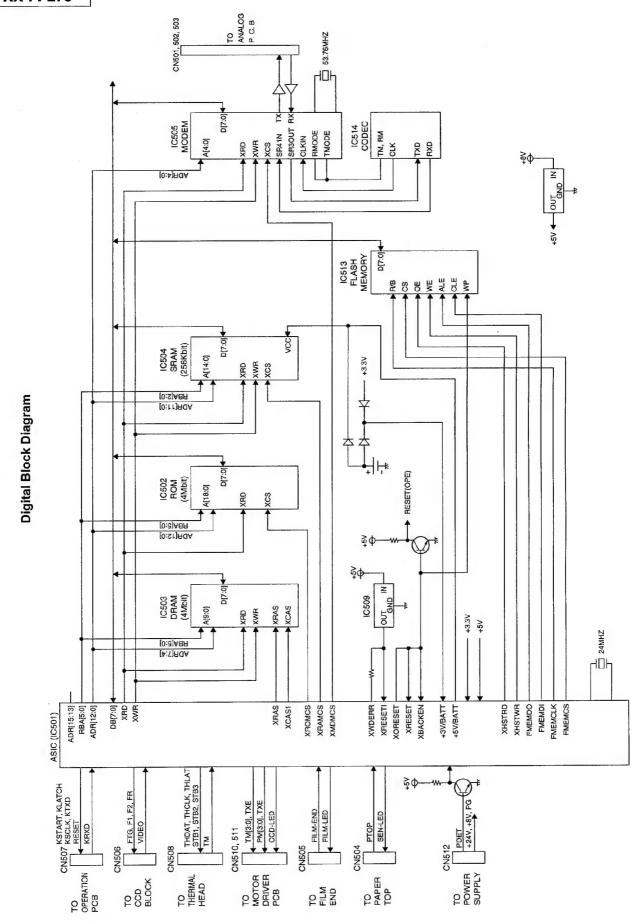
What are the main signals for booting up the unit?

Please refer to the Block diagram.

The ASIC (IC501) controls all the other digital ICs. When the power is turned on, the ASIC retrieves the operation code stored in the ROM (IC502), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address.

It is the address bus by which the ASIC designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC to the ICs.

These signal lines are all controlled by voltages of 5V (H) or 0V (L).



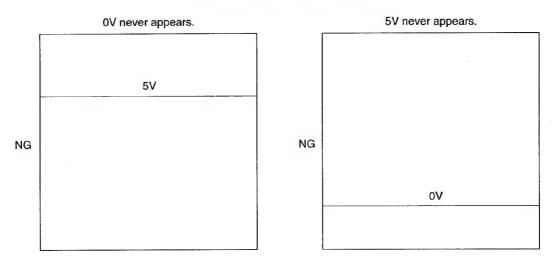
The signal lines that must be normal for the system to boot up are listed here [List 1].

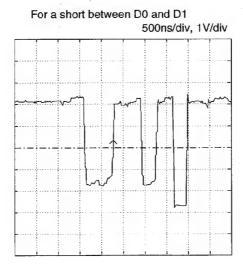
For signal lines other than these, even if they malfunction, they do not directly affect booting up the system.

[List 1] ① D0~D7 (Data Bus) ② A0~A15 (Address Bus) $\Im \overline{RD}$ (Read Signal) **ROMCS** (ROM Select Signal) WR (Write Signal) **RAMCS** (SRAM Select Signal) 4 RBA0~RBA5 (Bank Address Signal) **5** RAS (DRAM Row Address Strobe Signal) (DRAM Column Address Strobe Signal) CAS **6** MDMCS (Modem Select Signal)

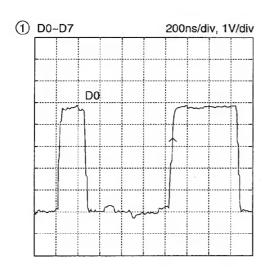
If these signals are normal, once the power is turned on, each IC repeatedly outputs 5V (H) and 0V (L). The following page shows NG and normal wave patterns.

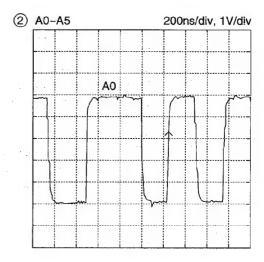
NG Wave pattern (Refer to page 76)

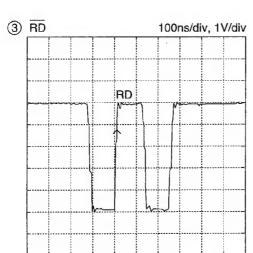


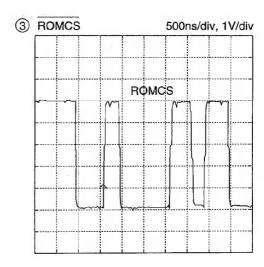


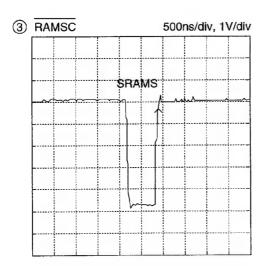
Normal Wave Patterns

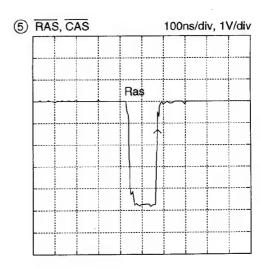












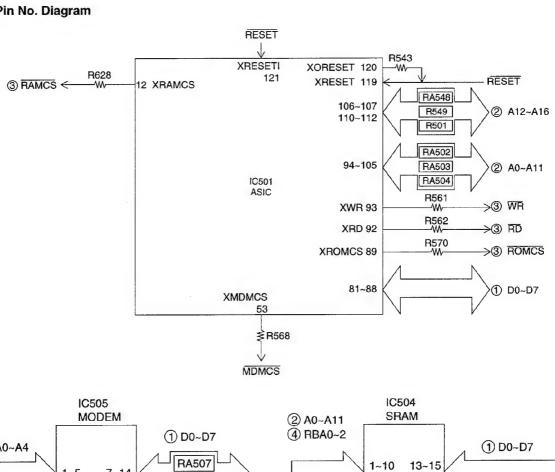
For these reasons and the software sequence to boot up the unit, if you use an oscilloscope to judge whether a signal is OK or NG, you must check in the same order as in [List 1]. (If the ASIC failed to access the ROM, the ASIC cannot access SRAM or DRAM normally.)

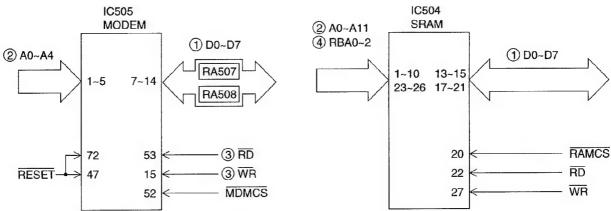
The digital circuit actually operates according to the timing combinations of these signals. So, if the timing of these signals is even slightly off, the circuit will not operate normally. Even of the IC did malfunction, the output voltage level may become abnormal but the timing is accurate according to the specifications. (If oscillation is provided accurately.)

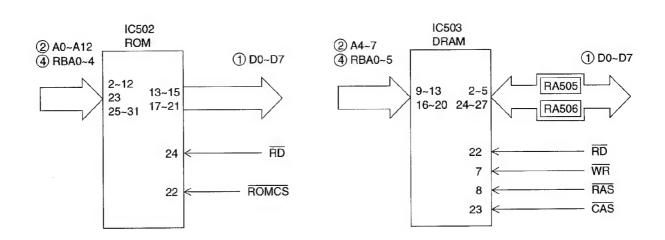
Accordingly, the problem presented here is whether each IC outputs the correct signal. (See the I/O direction diagram on the next page.) In other words, is it constantly switching between 5V (H) and 0V (L) as described earlier.

All you have to do is check that the IC repeatedly outputs (H) 5V and (L) 0V.

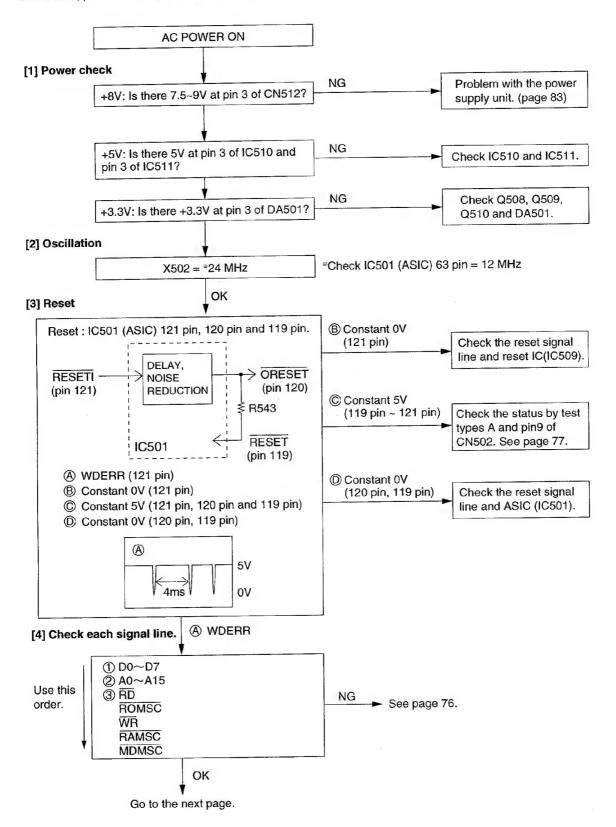
I/O and Pin No. Diagram

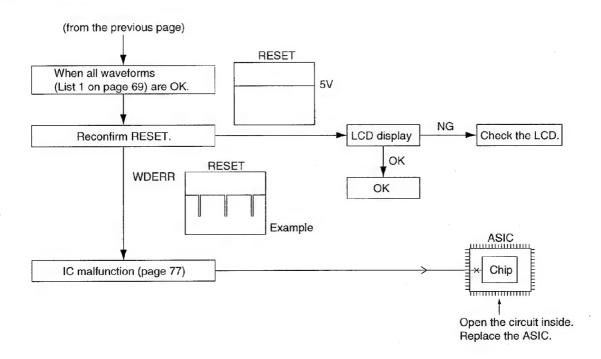




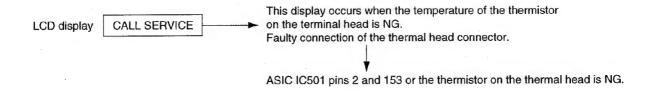


After the power is turned on, the ASIC initializes and checks each IC. The ROM, SRAM, and modem are checked. If initialization fails for the ICs, the system will not boot up. In this case, please find the cause as follows.



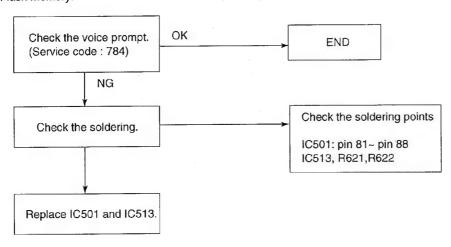


Other NG examples while the power is ON and the LCD displays the following.



FLASH MEMORY (IC513)

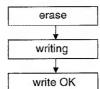
If the unit is working correctly but the VOICE GUIDANCE (voice prompt) is not heard, you should check the Flash Memory.



A voice message is pre-recorded in the Flash Memory (IC513). So, when you find an IC513 malfunction and exchange it with a new one. You have to pre-record the voice message by using a special ROM. How to use the special ROM (Voice Message Recording ROM)

- 1. Turn the AC power OFF.
- 2. Exchange the regular system ROM with the special ROM.
- 3. Turn the AC power ON.
- 4. The Voice Message Recording starts automatically.

LCD changes

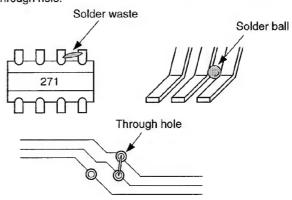


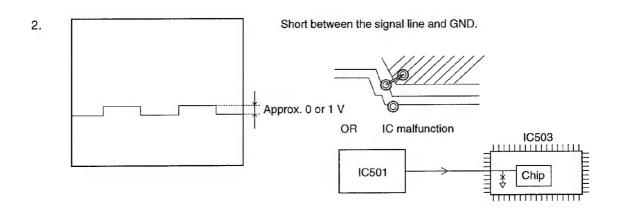
- 5. Turn the AC power OFF.
- 6. Exchange the special ROM with the regular system ROM.

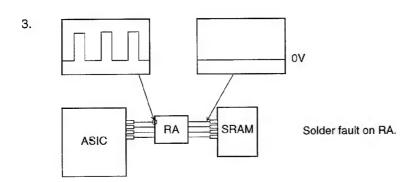
NG Example

1. 5V OV

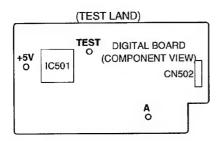
Short circuit from the adjacent signal wires. Check for a short circuit in the RA and IC leads and the signal wire at the through hole.

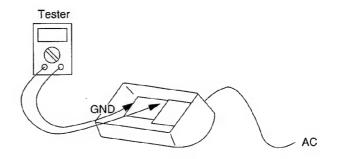






Please check the status (voltage) of test lands A, B and C. These statuses may tell you a defective point.





- Turn off the power supply.
- Short using a metallic object, such as tweezers, between the test and +5V land, and turn on the AC power for few seconds. And then remove a metallic object.
- Check the following voltages using an oscilloscope or tester.
- To cancel the status check mode, turn off the AC power.

D. ()	Check	point voltage	Check items					
Defective point	Defective point A		Check lenis					
RTC (IC501)	0V	0V	IC501(RTC is included in IC501)					
DRAM (IC503)	oV	5V	IC503(8,23 pin), R566, R567, RA506, RA505, L523, C562, C565, IC501(78, 79 pin)					
MODEM (IC505)	5V	ov	IC501(72 pin), IC505(15, 52, 53 pin), R591, R599, C595, C597, C598, L525, L524, RA508, RA507					
ALL OK	5V	5V						

•This indicates that the Add/Data Bus, RAM, ROM, MODEM, and ASIC are all connected to the ASIC properly and that control from the ASIC is possible.

Please check the soldering and conduction of these components.

If there is no problem, replace the ICs.

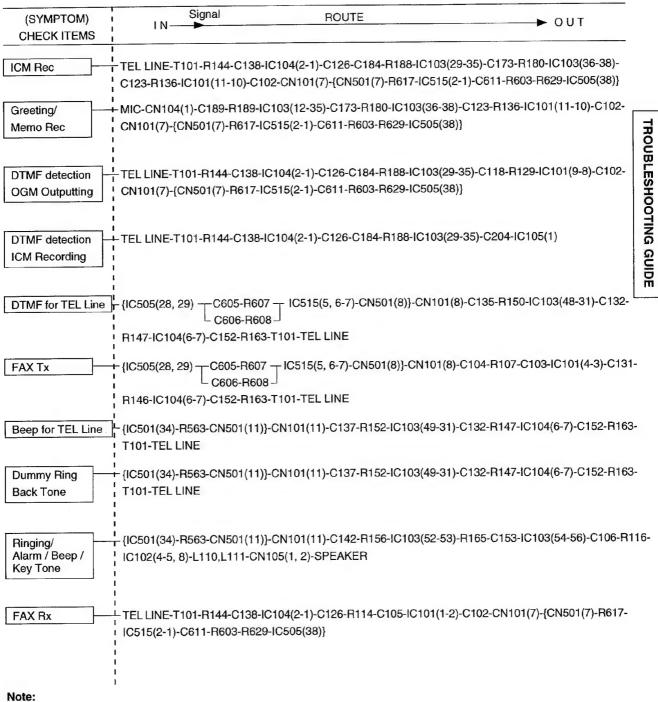
If you still have a problem with the digital board, please refer to page 69.

•To cancel the status check mode, turn off the AC power.

3.3.5 Analog Board Section

The analog parts check is actually different than the digital parts check. The signal route is determined by the purpose of the check. For example, the handset TX route begins from the handset microphone and is output in the telephone line. In this route, it is mainly an analog signal. Tracing the signal can be done easily using an oscilloscope. Each route is shown on the Check Sheet here. If there is a problem with the unit (for example, you cannot communicate with the H/S, etc.), trace the signal in the area and determine the cause.

CHECK SHEET Signal (SYMPTOM) **ROUTE** ► OUT IN **CHECK ITEMS** SP-PHONE Tx -MIC-CN104(1)-C189-R189-IC103(12-44)-CN101(9)- {CN501(9)-C615-R606-R683-IC514(23-6)-IC505 (82-28, 29) — C605-R607 — IC515(5, 6-7)-CN501(8)} -CN101(8)-C135-R150-IC103(48-31)-C132-R147-- C606-R608 IC104(6-7)-C152-R163-T101-TEL LINE TEL LINE-T101-R144-C138-IC104(2-1)-C126-C184-R188-IC103(29-35)-C118-R129-IC101(9-8)-C102-SP-PHONE Rx CN101(7)- {CN501(7)-R617-IC515(2-1)-C611-R603-R629-IC505(38-83)-IC514(13-17, 18) — C601-R604-C602-R605 IC516(5, 6-7)-R615-CN501(10)} -CN101(10)-C134-R149-IC103(46-53)-R165-C153-IC103(54-56)-C106-R116-IC102(4-5, 8)-L110, L111-CN105(1, 2)-SPEAKER HANDSET MIC -- CN107(4)-L104-R217-C211 -- IC103(21, 22-31)-C132-R147-IC104(6-7)-C152-HANDSET Tx L CN107(1)-L101-R218-C212 R163-T101-TEL LINE HANDSET Rx TEL LINE-T101-R144-C138-IC104(2-1)-C126-C184-R188-IC103(29-15, 16) CN107(2, 3)- HANDSET SPEAKER $\{|C514(17, 18) + C601-R604 + |C516(5, 6-7)-R615-CN501(10)\}-CN101(10)-C134-R149-|C103(46-53)-R615-CN501(10)\}-CN101(10)-C134-R149-|C103(46-53)-R615-CN501(10)\}-CN101(10)-C134-R149-|C103(46-53)-R615-CN501(10)\}-CN101(10)-C134-R149-|C103(46-53)-R615-CN501(10)\}-CN101(10)-C134-R149-|C103(46-53)-R615-CN501(10)\}-CN101(10)-C134-R149-|C103(46-53)-R615-CN501(10)]-CN101(10)-C134-R149-|C103(46-53)-R615-CN501(10)]-CN101(10)-CN$ **DTMF** - C602-R605-R165-C153-IC103(54-56)-C106-R116-IC102(4-5, 8)-L110-L111-CN105(1, 2)-SPEAKER Monitor {IC505(28, 29) — C605-R607 — IC515(5, 6-7)-CN501(8)}-CN101(8)-C136-R151-IC103(49-15, 16) Handset - C606-R608 ^{_]} L103 — CN107(2, 3)-HANDSET SPEAKER C214-L102-TEL LINE-T101-R144-C138-IC104(2-1)-C126-R114-C105-IC101(1-2)-C102-CN101(7)-{CN501(7)-R617-CNG detection IC515(2-1)-C611-R603-R629-IC505(38)} -TEL LINE-T101-R144-C138-IC104(2-1)-C126-C184-R188-IC103(29-35)-C173-R180-IC103(36-38)-R173-VOX detection C166-R172-IC103(40-42)-CN103(4)-{CN503(4)-IC501(18)} -C605-R607 - IC515(5, 6-7)-CN501(8)}-C135-R150-IC103(48-31)-C132-R147-{IC505(28,29) Greeting for TEL Line C606-R608-MSGS for TEL Line IC104(6-7)-C152-R163-T101-TEL LINE Note: }: Inside the digital board



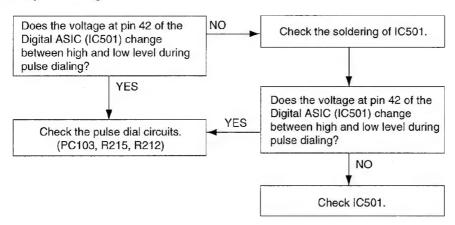
}: Inside the digital board

1) Defective ITS (Integrated Telephone System) Section

① No handset and speakerphone transmission / reception

Following the ITS section or NCU section, search for the route between the handset microphone and telephone line (sending), or between the telephone line and the handset speaker (receiving), or between the microphone and the telephone line (sending), or between the telephone line and the speaker (receiving) where the signal disappears using the "CHECK SHEET" on pages 78 and 79. Check the components at that point.

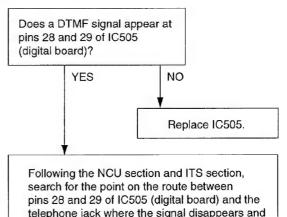
2 No pulse dialing



3 No ring tone (or No bell)

Check the bell detection circuit (page171). NO Is the bell detection circuit OK? YES Does a ring tone signal NO appear at pin 34 of IC501 Replace IC501. (digital board)? YES Following the ITS section, search for the point on the route between the ASIC and speaker where the signal disappears and check the components at that point. (RINGING: Refer to "CHECK SHEET" on page 79.)

4 No tone dialing

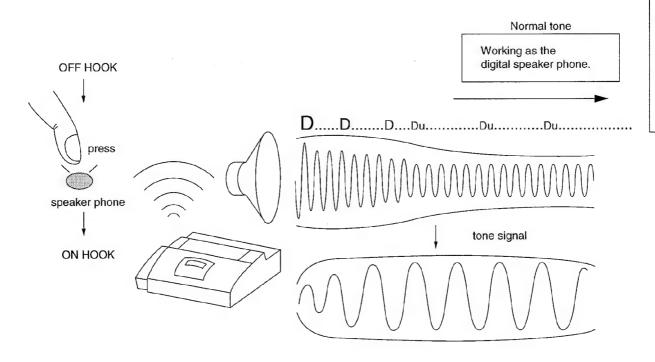


3.3.6. Digital speakerphone section

The digital speaker phone is different from the analog speaker phone.

The previous type (analog speaker phone) switches between Tx or Rx. Either Tx or Rx is able to pass through a telephone line or speaker, depending on the Tx and Rx signal (voice) level. The larger one can pass through the route for that signal. Therefore, you never hear the other party's voice while you are talking. But with the digital speaker phone feature, you can hear the other party's voice while you are talking. So both Tx and Rx are active at the same time. Troubleshooting is also different from the previous type.

At the start of communication, for the initial 2~3 exchanges the digital speakerphone performs half-duplex operation, alternating between transmission (Tx) and reception (Rx). Then duplex communication becomes possible. Learning occurs during the initial 2~3 exchanges of communication in order to set the appropriate parameters for duplex communication.

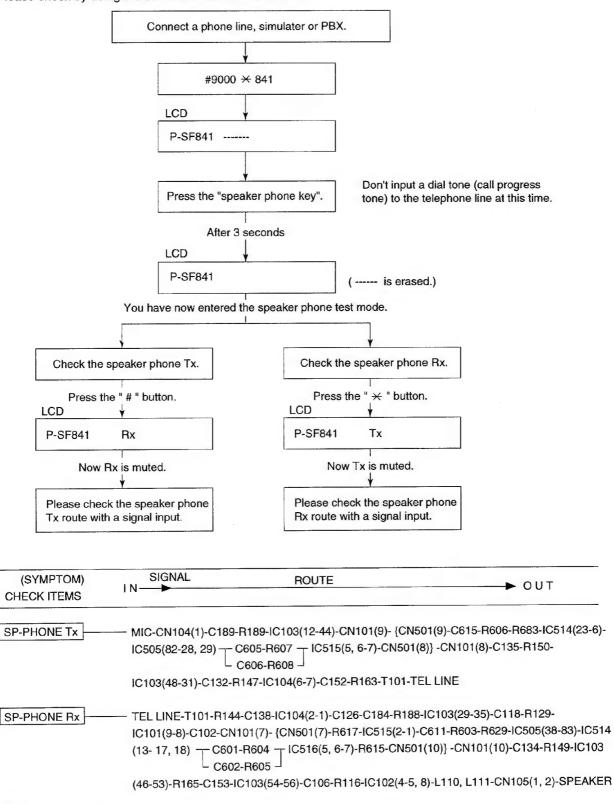


You cannot check the digital speaker phone by the previous method (signal route) because the level is changing as stated above.

Therefore, there is a service function for this troubleshooting. In this service mode, you can set the mute to either Tx or Rx. Then you can check the signal route of the speaker phone Tx or speaker phone Rx without any disturbances.

HOW TO USE THE 841 SERVICE FUNCTION for THE DIGITAL SPEAKER PHONE

Please check by using the service function #9000 \times 841.



Note:

{ }: Inside the digital board

3.3.7 Power Supply Board Section

(1) Key components for troubleshooting

The following components have been known to break frequently:

F101, D101-D104, C106, Q101, PC101, IC101, F201.

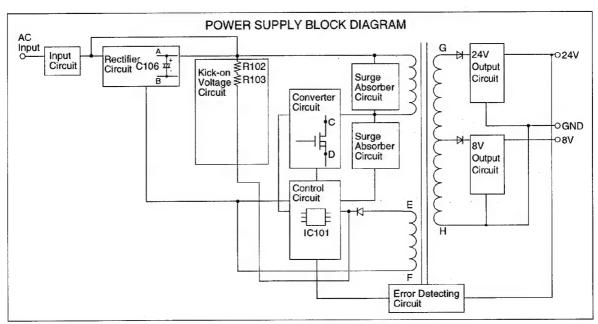
This comes from our experience with experimental tests. For example : power supply, lightning surge voltage test, withstanding voltage test, intentional short circuit test, etc.

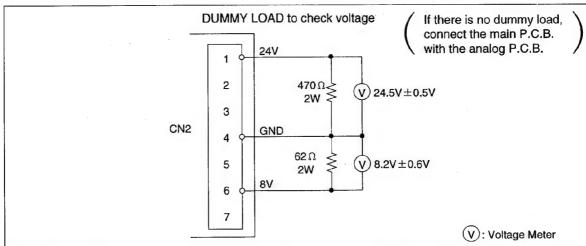
Caution:

If you find a melted fuse in the unit, don't turn the power on without repairing the unit first. (Except for the fuse.) If you do, the fuse will melt again and the unit has not been repaired. The problem exists somewhere else.

In most cases, (our experience) the symptom is that nothing is output.

There is a high possibility in the primary side more than the secondary side.



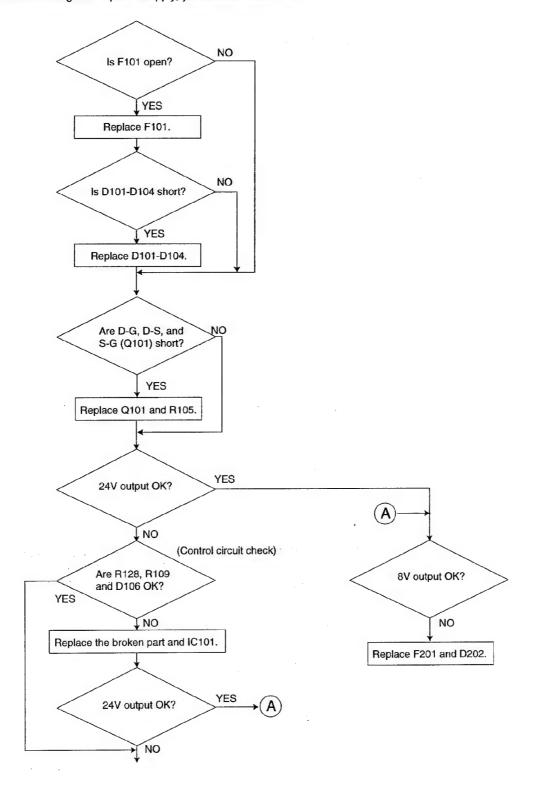


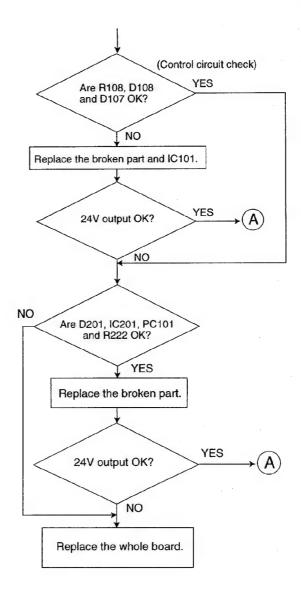
(2) Troubleshooting Flow Chart

Our recommendation for troubleshooting is as follows.

This procedure comes from our experience of troubleshooting in our lab.

 $\ensuremath{\mathbb{X}}$ Before turning on the power supply, you should check F101.





(3) Broken parts repair details

(D101, D102, D103, D104)

Check for a short-circuit in terminal 4. If D101, D102, D103 and D104 are short-circuited, F101 will melt (open). In this case, replace all of the parts (D101, D102, D103, D104, F101).

(Q101)

The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101.

This is due to a very high voltage through the Gate circuit which is composed of R128, R109, D106 and IC101. You should change all of the parts listed as follows.

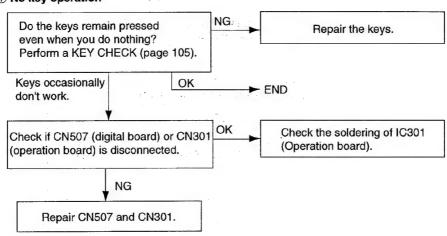
F101, Q101, R128, R109, D106, IC101

(D201)

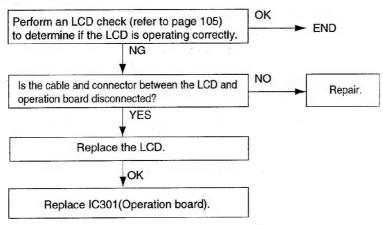
If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

3.3.8 Operation Panel Section

1 No key operation



2 No LCD indication



Replace Pl303.

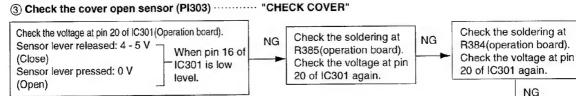
3.3.9 Sensor Board Section (Refer to pages 157 - 161 for the circuit descriptions.)

Perform an SENSOR CHECK (815: refer to page 106) to determine if the sensor is operating correctly.

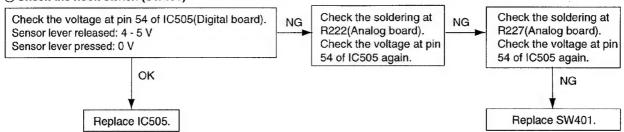
OK

Replace IC303.

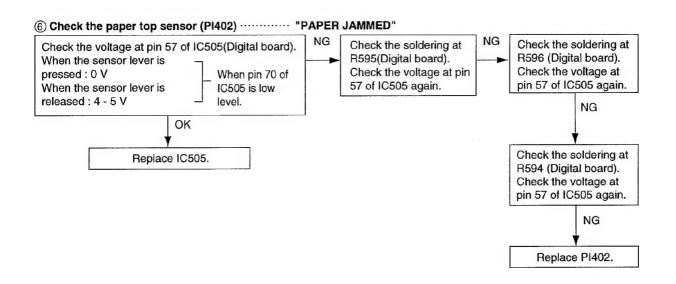
① Check the read position sensor (PI301) ········ "REMOVE DOCUMENT" Check the soldering at Check the soldering at Check the voltage at pin 20 of IC301(Operation board). NG NG R382(operation board). R385(operation board). Sensor lever pressed: 0 V When pin 4 of Check the voltage at pin Check the voltage at pin (Read position) IC301 is low 20 of IC301 again. 20 of IC301 again. Sensor lever released: 4 - 5 V level. NG (Out of read position) OK Replace PI301. Replace IC301. ② Check the document sensor (PI302) ····· "CHECK DOCUMENT" Check the voltage at pin 20 of IC301(Operation board). Check the soldering at Check the soldering at NG NG Sensor lever released: 4 - 5 V When pin 9 of R385(operation board). R383(operation board). (Document) IC301 is low Check the voltage at pin Check the voltage at pin Sensor lever pressed: 0 V level. 20 of IC301 again. 20 of IC301 again. (No document) NG ΟK Replace Pl302. Replace IC301.



4 Check the hook switch (SW401)



(5) Check the paper set switch (SW101) "CHECK LEVER" Check the soldering at Check the soldering Check the voltage at pin 55 of IC505(Digital board). NG NG R228(Analog board). at R230 (Analog When the cassette lock lever is released: 0 V Check the voltage at pin board). Check the When the cassette lock lever is set: 4 - 5 V 55 of IC505 again. voltage at pin 55 of IC505 again. OK NG Replace SW101. Replace IC505.



7 Check the film end sensor (PI403) ······ "FILM EMPTY" Sensor check (SERVICE CODE NO. 815) OK See if "Ri" appears on the LCD Replace the film and try again. display and then disappears, or check the operation of the film TROUBLESHOOTING GUIDE gear (refer to page 129). NG NG Does the connector Q513 Check the soldering at R589 Check the soldering at Q513. (Digital board) show 5V? and R590. Check whether Q513 is 5V or not. Check whether Q513 is 5V or not. OK NG NG Check the voltage at pin 1 of Check the soldering at Pl403. CN505. When the film gear works, (Sensor board) Replace Q513. the voltage changes between Check the voltage at pin 1 of CN505. 0 and 5V. NG OK Replace PI403. Check the soldering at Q511, Q512, Check the voltage at pin 25 of R580, R583, R584, R585, R586, IC501(Digital board). When the film gear works, the voltage R587 and R588. Check the voltage at pin 25 of IC501. changes between 0 and 5V. OK NG Replace IC501. Replace Q511 and Q512.

3.3.10 CCD Board Section

Refer to pages 153 for circuit descriptions.

**The CCD BOARD installed on the CCD UNIT is adjusted precisely in our production line.

Therefore, if the CCD board is reinstalled while making repairs, it must be readjusted after troubleshooting.

(Refer to page 114.)

If the printout is correct while receiving test printing but incorrect while copying, the read section may be broken. This is caused by the CCD UNIT or ASIC (IC501) [Digital board].

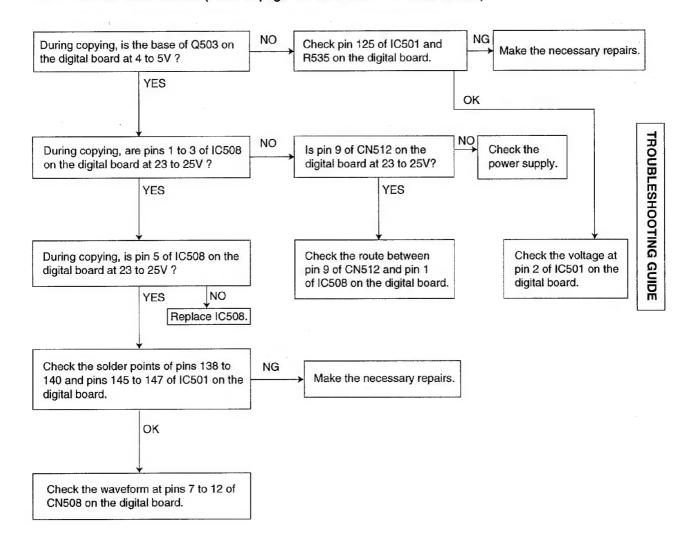
First, perform a SCAN CHECK to determine if the LED array lights. (Refer to page 105.)

CONDITION	CAUSE	REMEDY
IC501 outputs the signal for the CCD UNIT correctly. But the CCD UNIT doesn't output an analog image signal.	The CCD board is broken.	Replace the CCD board.
IC501 outputs the signal for the CCD UNIT correctly. But the CCD UNIT outputs an analog image signal correctly.	An analog part in the ASIC is broken.	Replace IC501.
IC501 doesn't output the signal for the CCD UNIT correctly.	A logic part in the ASIC is broken.	Replace IC501.

Note: Refer to pages 153 for the timing descriptions.

(Check the connection between IC501 and the CCD board.)

3.3.11 Thermal Head Section (Refer to page 151 for the thermal head circuit.)

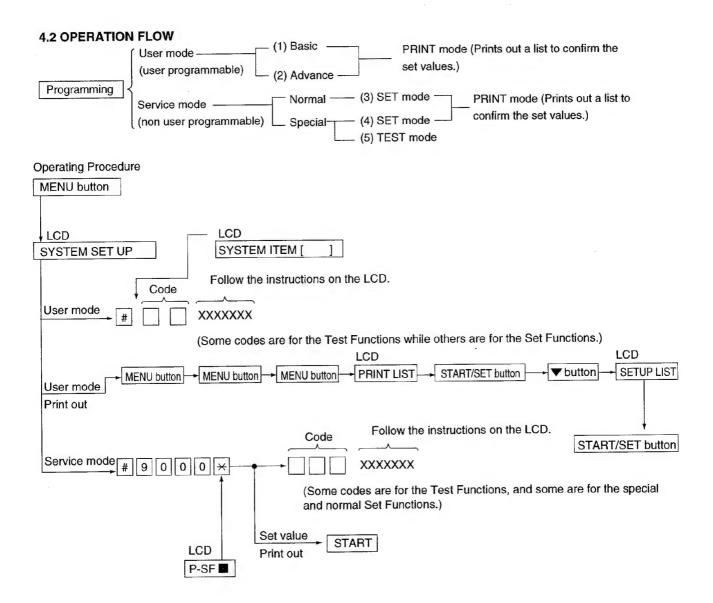


4. PROGRAMMING AND LISTS

The programming functions are used to program the various features and functions of the unit, and to test the unit. This facilitates communication between the user and the service man while programming the unit.

4.1 OPERATION

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and available to the user. The special programs are those only listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test various functions . The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.



4.3 USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)

SETUP LIST

L BASIC FEATURE LIST 1

```
CURRENT SETTING
             FEATURE
             SET DATE & TIME
                                                 Jan. 01 1998 12:06AM
      #101
      #02
             YOUR LOGO
             YOUR FAX NUMBER
      #03
Code
             PRINT SENDING REPORT
                                                 ERROR
                                                            [ERROR, ON, OFF]
      H04
                                                            [1...4, TOLL SAVER, RINGER OFF]
             TAD/FAX RING COUNT
                                                 2
      #06
                                                 VOX
                                                            [UOX, 1MIN]
             RECORDING TIME
      #10
             REMOTE TAD ID
                                            ID = 111
      #11
                                                            (AUTO, TONE, PULSE)
                                                 AUTO
      #13
             DIALING MODE
                                                            [ON,OFF]
                                                 OFF
             SEND BY MEMORY
      #15
                                                     Set Value
       [ ADVANCED FEATURE LIST ]
                                                 CURRENT SETTING
             FEATURE
             JOURNAL AUTO PRINT
                                                 ON
                                                            (ON, OFF)
      #22
                                                 OFF
                                                            [ON.OFF]
      #23
             OVERSEAS MODE
             DELAYED TRANSMISSION
                                                 OFF
                                                            [ON,OFF]
      #25
Code
                                  DESTINATION =
                                                 12:00AM
                                   START TIME =
                                                            [ON,OFF]
             AUTO CALLER ID LIST
                                                 ON
      #26
             SILENT FAX RECOGNITION RING
                                                 3
                                                            [3...6]
      HER
                                                 OFF
                                                            [OFF,A,B,C,D]
             RING DETECTION
      #31
      #36
             RECEIVE REDUCTION
                                                  92%
                                                            [72,86,92,100]
      #39
             LCD CONTRAST
                                                 NORMAL
                                                            [NORMAL, DARKER]
             FAX ACTIVATION CODE
                                                 ON
                                                            [ON,OFF]
      #41
                                          CODE = *9
                                                            [ON,OFF]
      #42
             MESSAGE ALERT
                                                 OFF
                                                 OFF
                                                            [ON, OFF]
             RECORDING TIME ALERT
      #43
                                                            [ON,OFF]
                                                 DN
       #44
             MEMORY RECEIVE ALERT
             FRIENDLY RECEPTION
                                                 ON
                                                            [ON,OFF]
      #46
                                                            [ERROR, ON, OFF]
      #47
             FAX VOICE GUIDANCE
                                                 DN
             GREETING MSG. RECORDING TIME
                                                            [16s,60s]
      #54
                                                 16s
      NOTE: If you change from 60sec. to 16sec.
              your-greeting will be erased and your new greeting will be limited to 16 seconds.
             MESSAGE TRANSFER
                                                 OFF
                                                            [MESSAGE, PAGER, OFF]
      #60
                                  DESTINATION =
             TRANSFER GREETING
                                                 CHECK
                                                            [CHECK, RECORD, ERASE]
      #61
                                                            [ON,OFF]
             ICM MONITOR
                                                 ON
      #67
             FAX PAGER CALL
                                                 OFF
                                                            [ON,OFF]
                                  DESTINATION =
                                                 OFF
                                                            ION, OFF I
      #75
             IQ-FAX
       #76
             CONNECTING TONE
                                                 ON
                                                            ION.OFF1
      #77
             AUTO ANSWER MODE
                                                 TAD/FAX
                                                            [TAD/FAX, FAX ONLY, TEL/FAX]
             TEL/FAX DELAYED RING
                                                            [1...4]
      #78
                                                 2
       #79
             FILM DETECTION
                                                 UN
                                                            ION.OFF1
             SET DEFAULT
       #80
                                                     Set Value
```

IF YOU HAVE A PROBLEM WITH YOUR FAX MACHINE, CALL TOLL-FREE 1-800-HELP-FAX (1-800-435-7329)

Note:

The above values are the default values.

4.4 SERVICE FUNCTION TABLE

Code	Function	Set Value	Effective Range	Default	Remarks
501	Pause time set	X 100 msec	001~600	050	
502	Flash time set	X 10 msec	01~99	70	
503	Dial speed select	1:10 pps 2:20 pps	1, 2	1	
510	VOX TIME	1:6 sec 2:4 sec	1, 2	1	
520	CED frequency select	1:2100 Hz 2:1100 Hz	1, 2	1	See page 52.
521	International mode select	1:ON 2:OFF	1, 2	1	See page 52.
522	Auto standby select	1:ON 2:OFF	1, 2	1	The resolution reverts to the default when transmission is complete.
523	Receive equalizer select	1:0 km 2:1.8 km 3:3.6 km 4:7.2 km	1~4	1	Set RX equalizer to automatical mode.
524	Transmission equalizer select	1:0 km 2:1.8 km 3:3.6 km 4:7.2 km	1~4	1	
533	Setting the number of times that massage transfer is redialed.	00~99	00~99	030	Selects the number of times that message transfer is redialed (not including the first dialing).
534	Setting the message transfer/pager call redial interval	001~999 sec	001~999	030	Sets the interval of message transfer/pager call redial.
550	Memory clear: To reset the value and left margin (854).	to the default one, excep	ot the top margin	(853)	"START" input
551	ROM check				"START" input
552	DTMF single tone test	1:ON 2:OFF	1, 2	2	See page 105.
553	Monitor on FAX communication select	1: OFF 2:PHASE B 3:ALL	1~3 ,	1	
554	Modem test				See page 105.
555	Scan check				See page 105.
556	Motor test			00	See page 105.
557	LED test			77.0	See page 105.
558	LCD test				See page 105.
559	Document jam detection select	1:ON 2:OFF	1, 2	1	See page 28.
561	KEY test				See page 105.
563	Scanner position adjustment value set	X 1 mm	00~30		See page 119.

Code	Function	Set Value	Effective Range	Default	Remarks
570	BREAK % select	1:61% 2:67%	1, 2	1	
571	ITS auto redial time set	X number of times	00~99	14	
572	ITS auto redial line disconnection time set	X second	001~999	030	
573	Remote turn-on ring number set	X number of rings	01~99	15	
580	TAM continuous tone detection	1:ON 2:OFF	1,2	1	
590	FAX auto redial time set	X number of times	00~99	005	
591	FAX auto redial time disconnection time set	X second	001~999	045	
592	CNG transmit select	1: OFF 2:ALL 3:AUTO	1~3	2	
593	Time between CED and 300bps	1: 75 msec 2:500 msec 3:1 sec	1~3	1	See page 52.
594	Overseas DIS detection select	1:detects at the 1st time 2:detects at the 2st time	1, 2	1	See page 52.
595	Receive error limit value set	X Number of times	001~999	100	If the number of errors during transmission exceeds this value, the sending side terminates the call.
596	Transmit level set	X dBm	- 15~00	10	Values entered without a "minus sing" will be regarded as negative.
598	Receiving sensitivity	43=-43 dBm	20~48	41	Used when there is an error problem. If set to 41, the vaule will become -43dBm on the hardware side.
599	ECM Frame size	1: 256 byte 2:64 byte	1, 2	1	Used during ECM communication.
602	Warning LIST Printing	1:ON 2:OFF	1, 2	1	Used to print a caution list when setting the TEL/FAX mode and ring detection.
717	Transmit speed selection	1:14400BPS 2:12000BPS 3:9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Sets fall back speed in the transmitting mode.(See page 52.)
718	Receive speed selection	1:14400BPS 2:12000BPS 3:9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Sets fall back speed in the receiving mode.(See page 52.)
719	Ringer off in TEL/FAX mode	1:ON 2:OFF	1, 2	1	Selects whether the ring is on or off when the unit receives an incoming signal in the TEL/FAX mode when the ringer.
721	Pause tone detect	1:ON 2:OFF	1, 2	1	Sets the tone detection mode in pause.
722	Redial tone detect	1:ON 2:OFF	1, 2	1	Sets the tone detection mode after redialing.

Code	Function	Set Value	Effective Range	Default	Remarks
731	CPC mode	1:A 2:B 3:OFF	1~3	1	Sets the CPC signal detection mode from the converter
732	AUTO disconnect cancel time	1:350 ms 2:1.8 sec 3:OFF	1~3	1	Sets to "2" when the auto disconnect circuit operates and cuts the line.
745	Poewr ON film feed	1:ON 2:OFF	1, 2	1	When the power is turned on, the film is wound to take up any slack.
763	CNG detect time for friendly reception	1:10 sec 2:20 sec 3:30 sec	1~3	3	The period during which CNG is detected during friendly reception.
771	T1 timer	1:35 sec 2:60 sec	1, 2	1	Sets the time out.
775	Monitoring of message transfer	1:ON 2:OFF	1, 2	2	If set to ON a message can be monitored from this unit's SP-PHONE when transferring a message.
784	Voice prompt test				see page 75.
815	Sensor & Vox check				See page 106.
841	Digital SP-phone check				See page 82.
852	Print test pattern				See page 105.
853	Top margin		1~9		
854	Left margin		1~8		
861	A4 size set	1:ON 2:OFF	1, 2	2	Used only at the factory.
880	History list		See page 98.		
881	Journal 2 list				See page 103.
882	Journal 3 list				See page 104.
890	TEL/FAX 1st ring back tone	1:ON 2:OFF	1, 2	1	Selects whether the TEL/FAX 1st ring back tone is ON or OFF in the TEL/FAX mode.

4.5 SERVICE MODE SETTINGS (Example of a printed out list)

	501 F 502 F 503 I 510 V 520 C 521 I 522 F 523 F 524 I 853 I 854 L	RUICE I Code PAUSE 1 FLASH 1 DIAL SF VOX TIN DED FRE (NTL. N AUTO ST RX EQL. FX EQL. FOP MAR LEFT MA	IME IME EED TE TODE TANDBY RGIN				s Hz n	alue	[001 [01 [1=10] [1=6] [1=210] [1=0N] [1=0N] [1=0.0] [1=0.0] [19	99]* 30 3 3]*100ms 10ms 2=20]pp 2=4]sec 2=1100] 2=0FF] 2=0FF] 2=1.8 2=1.8	os C	4=7.2] 4=7.2]	TROUBLESHOOTING
	t SPE	ECIAL 9	SERVICE	SETT.	INGS 1			•						0
/	533 ∕⁄ Ø3 、	534 030	552 2	553 1	559 1	563 15	570 1	571 14	572 Ø3Ø	573 15		590 05	591 Ø45	
Code		Set V		COE	FOC	598	602	717	718	719	721	722	731	E
	592	593	594	595	596	41	1	1	1	1	1	1	1	GUIDE
	2	1	1	100	10	41	_	1	+	•	-	-	•	m
	732	745	763	771	775	861	890							
	1	1	3	1	2	2	1							
	USAGE	ETIME	= 0000	ae Houl	R S									

Note:

The above values are the default values.

I HISTORY 1

			2 - -					(1)			[5	5 0	4	3			(2))																		•		
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Note: See the next page for an explanation of this report.

PHONE SURVEY RESULT.

Descriptions of individual items on the previous page.

ROM VERSION

EPROM version

SHM

EPROM internal data calculation.

(3) YOUR LOGO

The recorded LOGO in the unit. If it is not recorded, NONE will be displayed.

YOUR TELEPHONE NUMBER

The recorded user telephone number in the unit. If it is not recorded, NONE will be displayed.

FAX PAGER NUMBER

If you program a pager number into the unit, the pager number will be displayed here.

FACTORY - CUSTOMER

This shows how many days from factory production until the user turns ON the unit.

MONTH

- DAY (8)
- YEAR (9)

(10) TIME

The shows the very first month, date, year and time set by the user after they purchased the unit.

(11) USAGE TIME

The amount of time the unit has been powered ON.

(12) FACTORY - NOW

This shows how many days from factory production until the user prints out this history list.

(13) TEL MODE

The amount of time the TEL mode setting was used.

(14) FAX MODE

The amount of time the FAX mode setting was used.

(15) TEL/FAX MODE

The amount of time the TEL/FAX mode setting was used.

(16) ANS/FAX MODE

The amount of time the ANS/FAX mode setting was

(17) FINAL RECEIVE MODE

The last set receiving mode by the user.

(18) TONE/PULSE SELECTION

The most recently used setting used, either TONE or PULSE.

(19) RECEIVE REDUCTION

The compression rate when receiving.

(20) SETTING NO. OF DIRECTORY

The recorded directory stations (one touch and JOG DIAL).

(21) NUMBER OF COPY

The number of pages copied.

(22) NUMBER OF RECEIVE

The number of pages received.

(23) NUMBER OF SENDING

The number of pages sent.

(24) NUMBER OF CALLER ID

The number of times Caller ID was received.

(25) NUMBER OF RECORDING MESSAGE

The number of messages recorded in TAM.

(26) NUMBER OF PC SCAN

The number of times multifunction was used for the Scanner. (The number of pages scanned. If the unit does not have a PC interface, NONE will be printed.)

(27) NUMBER OF PC-PRINT

The number of times multifunction was used for the Printer. (The number of pages printed. If the unit does not have a PC interface, NONE will be printed.)

(28) NUMBER OF RECEIVING TO PC

The number of times received in the PC through the FAX serial interface (RS232C). (The number of pages received. If the unit does not have a PC interface, NONE will be printed.)

(29) NUMBER OF SENDING FROM PC

The number of times transmitted from the PC through the FAX serial interface (RS232C). (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(30) NUMBER OF PRINTING WARNING LIST

The number of warning lists printed until now.

(31) NUMBER OF PRINTING HELP

The number of help lists printed until now.

(32) NUMBER OF DIVIDED PRINTING IN FAX RECEPTION

The number of faxes received that were divided into more than one sheet since the unit was purchased.

(33) DETECTION OF RS232C

When the fax and PC serial cable (RS232C) are connected and the signal is received correctly. COMPLETE will be printed. For models without a PC interface or when there is a PC interface but the signal cannot be received between the fax and PC, INCOMPLETE will be printed.

(The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(34) NO. OF IQ FAX LOADING -OK-

(35) NO. OF IQ FAX LOADING -NG -

You may not be able to use IQ-FAX if the special subscriber information is not loaded from the IQ-FAX center before use. Depending on the conditions of the communication line, it may not be completed in one time, so retried will be performed. The number of times there was an OK and NG are printed.

(36) FAX MODE

Means the unit received a fax message in the FAX mode.

(37) MAN RCV

Means the unit received a fax message by manual operation.

(38) FRN RCV

Means the unit received a fax message by friendly signal detection.

(39) VOX

Means the unit detected silence or no voice.

(40) RMT DTMF

Means the unit detected DTMF (Remote Fax activation code) entered remotely.

(41) PAL DTMF

Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.

(42) TURN-ON

Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)

(43) TIME OUT

Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.

(44) IDENT

Means the unit detected Ring Detection.

(45) CNG OGM

Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode, or while answering a call in the EXT-TAM mode.

Means the unit detected the CNG while it was sending the OGM in the ANS/FAX mode.

(46) CNG ICM

Means the unit detected the CNG while it was recording the ICM in the ANS/FAX mode.

(47) KEY OPERATION -1st 50

OR

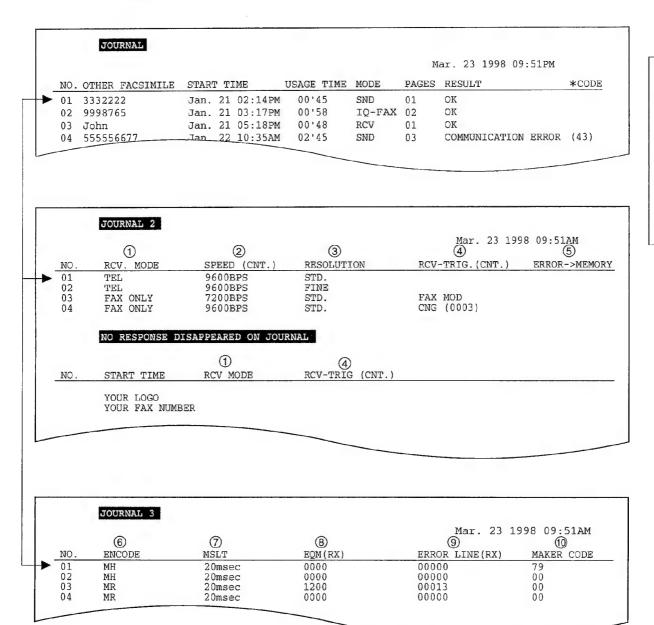
(48) KEY OPERATION -Last 50

Indicates 2-digit codes. Refer to "5.2 BUTTON CODE TABLE" on page 106.

- 1st 50: History of the first 50 key operations after purchase.
 (Ex.) If 20, 3C and 39 are printed, then the
 MENU, # and 9 buttons were pressed.
- · Last 50:History of the last 50 key operations.

4.7 SPECIAL SERVICE JOURNAL REPORTS

Journal 2 or Journal 3 shown below, which are special journals giving additional detailed information about the latest 35 communications, can be printed using service code 881 or 882. They can also be printed out remotely (with the existing journal). [Refer to page 62.] Journal 2 and Journal 3's data are related.



For example, the 1st communication in the Journal above is a Fax transmission in the Tel mode, at 9.6 kbps TX speed, the resolution is standard, a MH code is used, and the Maker code is 79.

The 2nd one is IQ-Fax in Tel mode, and the resolution is fine etc.

CNG (0003) means the 3rd time a CNG signal was received for Fax Rx from purchasing the unit until now. Journal 2 and Journal 3 are explained on the next page.

4.7.1 **JOURNAL** 2

Journal 2 displays the additional detailed information about the last 35 communications.

Description of individual items from the previous page.

1) RCV. MODE

Indicates which receive mode the unit was in when the unit received a fax message.

This information is also displayed when the unit transmitted a fax message.

2 SPEED

Indicates the speed of the communication. If multiple pages are transmitted or received, it indicates the last page's communication speed. If there is a communication error, "?" is displayed.

③ RESOLUTION

Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page's resolution. If there is a communication error, "?" is displayed.

4 RX-TRIG. (CNT.)

Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in the below (Refer to page 100.) The values in parentheses indicate how many times the trigger has been used. (For example, "00003" means three times.)

⑤ ERROR→MEMORY

Indicates the reason why the unit received a fax message in memory.

In the printing example on the next page, a "paper out" error occurred and direct reception to fax memory took place.

NO RESPONSE DISAPPEARED ON JOURNAL

The NO RESPONSE DISAPPEARED ON JOURNAL displays the information about the last 10 communications terminated with No Response. (Some of the communications terminated by No Response were not displayed in the JOURNAL.)

When fax transmission cannot be performed because the ohter party's unit is set to the TEL mode,

" No response" will be printed.

4.7.2 **JOURNAL** 3

Description of individual items.

6 ENCODE

Compression Code: MH/MR

7 MSLT

MSLT means Minimum Scan Line Time. Use only at the factory.

® EQM

EQM means Eye Quality Monitor. Use only at the factory.

9 ERROR LINE(RX)

When an error occurs while receiving a fax, this shows the number of lines received.

10 MAKER CODE

This shows a 2 digit code of the other party's fax machine brand.

0E: "KX" model

00: Unknown

79: "UF" model

19: "Zerox" model

4.7.3 PRINTOUT EXAMPLE

JOURNAL 2

Mar. 25 1998 Ø1:59PM

NO.	RCU. MODE	SPEED (CNT.)	RESOLUTION	RCU-TRIG. (CNT.)	ERROR->MEMORY	_
01	FAX ONLY	9600BPS	FINE.	FAX MOD		
02	FAX ONLY	9600BPS	STD.	FAX MOD		
03	FAX ONLY	9600BPS	FINE.			
04	FAX ONLY	9600RPS	FINE.	FAX MOD		
Ø5	FAX ONLY	9600BPS	FINE.	FAX MOD		TROUBLESHOOTING
9 6	FAX ONLY	9600BPS	FINE.	FAX MOD		0
07	FAX ONLY	9600BPS	FINE.			
98	FAX ONLY	9600BPS	FINE.			12
09	FAX ONLY	9600BPS	FINE.			四
10	FAX ONLY	9600BPS	STD.	FAX MOD		1 4
11	FAX ONLY	9600BPS	FINE.	FAX MOD	PAPER OUT	0
12	FAX ONLY	9600BPS	STD.	FAX MOD		2
13	FAX ONLY	9600BPS	STD.			=
14	FAX ONLY	?	?			ធ
15	FAX ONLY	?	?			
16	FAX ONLY	?	?			GUIDE
17	FAX ONLY	9600BPS	STD.			
18	FAX ONLY	9600BPS	FINE.	FAX MOD		m
19	FAX ONLY	9600BPS	STD.	FAX MOD		
20	FAX ONLY	9600BPS	S-FINE.			
21	FAX ONLY	9600BPS	FINE.			
22	FAX ONLY	9600BPS	FINE.	FAX MOD		
23	FAX ONLY	?	?	FAX MOD		
24	FAX ONLY	9600BPS	STD.	FAX MOD		
25	FAX ONLY	9600BPS	STD.	FAX MOD		
26	FAX ONLY	9600BPS	FINE.	FAX MOD		
27	FAX ONLY	9600BPS	FINE.			
28	FAX ONLY	9600BPS	STD.	FAX MOD		
29	FAX ONLY	9600BPS	FINE.	FAX MOD		
30	FAX ONLY	9600BPS	S-FINE.	FAX MOD		
31	FAX ONLY	9600BPS	STD.	FAX MOD		
32	FAX ONLY	9600BPS	STD.	FAX MOD		
33	FAX ONLY	?	?	FAX MOD		
34	FAX ONLY	9600BPS	STD.	FAX MOD		
35	FAX ONLY	9600BPS	STD.	FAX MOD		

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	RCV MODE	RCV-TRIG. (CNT.)

YOUR LOGO YOUR FAX NUMBER

JOURNAL 3

Mar. 25 1998 01:58PM

ND.	ENCODE	MSLT	EQM(RX)	ERROR LINE(RX)	MAKER CODE
Ø1	MR	10msec	007A	90000	ØE
02	MR	20msec	Ø16B	20000	ØØ
Ø 3	MH	10msec	0000	Ø Ø ØØØ	ØØ
04	MR	20msec	Ø19B	00003	00
Ø 5	MR	20msec	0156	00011	00
Ø6	MR	20msec	Ø1 1 3	0000 0	00
07	MR	5msec	8888	2200 0	79
08	MR	5msec	8988	00000	79
Ø9	MR	Ømsec	8888	00000	19
10	MR	20msec	0100	00000	00
11	MR	10msec	0073	00000	ØE
12	MR	20msec	Ø12B	99999	99
13	MH	20msec	9999	99999	79
14	MH	20msec	0000	00000	20
15	MH	20msec	0000	00000	00
16	MH	20mS€c	0000	00000	0 0
17	MR	5ms e c	0000	00000	79
18	MR	10msec	ØØAB	88884	ØE
19	MR	20msec	0124	90000	90
20	MR	20msec	<u> </u>	99999	20
21	MR	20msec	99 99	00000	00
22	MR	20msec	0135	00000	20
23	MR	20m5 ec	0000	00000	20
24	MR	20msec	01BC	00000	00
25	MR	20msec	Ø1AC	00000	00
26	MR	20msec	920F	99999	0 0
27	MR	10msec	9999	00000	ØE
28	MR	20msec	01DF	00000	20
29	MR	20msec	01EA	00000	00
30	MR	20ms=c	ØØCD	00000	20
31	MR	20msec	02F8	<i>00000</i>	ØE
32	MR	10msec	04F8	00000	ØE
33	MR	10msec	00 00	99099	00
34	MR	20msec	03B6	00000	0E
35	MH	20msec	00E0	20000	99

5. TEST FUNCTIONS

The codes listed below can be used to perform simple checks of some of the unit's functions. When complaints are received from customers, they provide an effective tool for identifying the locations and causes of malfunctions.

Test mode	Type of Mode	Code	Function		
restiniode	Type of Wode	Operation after code input			
MOTOR TEST	Service Mode	556 START	Rotates the transmission and reception motors to check the operation of the motors. 00 Stop		
		STAIL	10 FF RX motor Copy/List/Fax RX printing and print out 20 FF RX motor Copy/List/Fax RX printing and print out (When all white lines are read.) 01 FF TX motor Copy/TX reading		
			02 FF TX motor Document print out 03 Backward TX motor Factory use only 04 Backward TX motor Recording Paper is fed. Note: You can perform two tests at the same time. Ex. if you enter "14", the tests for "10" and "04" will be performed at the same time. When feeding the recording paper, the ink film should be inserted.		
			Press the STOP button to quit.		
MODEM TEST	Service Mode	554	First, go OFF-HOOK with the handset to enter this Test Mode. Each time you press the start key, each of the signals		
		START	will be heard in the following order from the handset. 1) OFF → 2) 14400bps → 3) 12000bps → 4) 9600bps (V17) → 5) 7200bps (V17) → 6) 9600bps → 7) 7200bps → 8) 4800bps → 9) 2400bps → 10) 300bps → →11) 2100Hz →12) 1100Hz		
ROM CHECK	Service Mode	5 5 1	Indicates the version and check sum of the ROM.		
		START			
SCAN CHECK	Service Mode	5 5 5	Turns on the LEDs of the CCD unit and operates the read		
		START	system. This is also used to adjust the CCD. (Refer to page 114.)		
LCD CHECK	Service Mode	5 5 8	Checks the LCD indication.		
		START	Illuminates all the dots to check if they are normal.		
DTMF SINGLE TEST	Service Mode	5 5 2	Outputs DTMF as single tones. Used to check the frequencies of the individual DTMF tones.		
1231		1On 2Off	Refer to "5.1 DTMF Single Tone Transmit Select" on page 106.		
LED TEST	Service Mode	557	All LEDs above the operation panel board flash on and off, or are illuminated.		
		START			
KEY CHECK	Service Mode	561	Checks the button operation.		
		START { any }	Indicates the button code on the LCD while the button is pressed. Refer to "5.2 Button Code Table" on page 106.		
FACTORY SET	Service Mode	550	Clears the memory where the user can store data.		
OLI		START			
CCD AUTO	Service Mode	564	Used only at the factory.		
POSITION ADJUSTMENT		START			
PRINT TEST	Service Mode	852	Prints out the test pattern.		
PATTERN		START	Used mainly at the factory to test the print quality. You can select 1~4. (See pages 107~110.)		
DIGITAL SPEAKERPHONE	Service Mode	841	Please refer to page 82.		
RX & TX CHECK		SPEAKERPHONE			

Test mode	Type of Mode	Code Operation after code input.	Function
SENSOR CHECK & VOX CHECK	Service Mode	START LCD display Do Sn Co PI Pt Ri Vx	After entering this mode, by operating the sensor levers, etc, using your hands, each sensor and SW display above the LCD will go ON/OFF. Also, when copying a document, the related sensor will turn ON/OFF. (Do, Sn, Pl, Pt, Ri) For each sensor's operation, refer to page 157. Paper inserted. Turns on when a document is inserted. At the read position. Turns on when the front cover is opened and the sensor lever is pressed directly. Cover open. Turns on and off when the front cover is opened and closed. Sensor on. Turns on and off when the cassette lock lever is pushed down and up. Sensor on. Turns on when the front cover is opened and the sensor lever is pressed directly. Sensor on. Turns on and off when the film end sensor gear is turned. Detection signal for the tone on the line. If there is a tone, it is ON.

Note: The numbers in the boxes (XXX) indicate the keys to be input for the various test modes.

5.1 DTMF SIGNAL TONE TRANSMIT SELECTION

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	Key	Low Frequency (Hz)
"1"	697	"5"	1209
"2"	770	"6"	1336
"3"	852	"7"	1477
"4"	941	"8"	1633

When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz)	1209	1336	1477
697	"1"	"2"	"3"
770	"4"	"5"	"6"
852	"7"	"8"	"9"
941	×	"0"	"#"

Note: After performing this check, do not forget to turn the setting off. Otherwise, dialing using DTMF will not be possible.

5.2 BUTTON CODE TABLE

Code	Button Name	Code	Button Name	Code	Button Name
02	RESOLUTION	31	1	3D	REDIAL/PAUSE
04	START/COPY/SET	32	2	3E	FLASH
05	LOWER	33	3	48	IQ-FAX
07	FILM REMAINING	34	4	64	STATION 1
08	SP-PHONE	35	5	65	STATION 2
0A	MUTE	36	6	66	STATION 3
				67	STATION 4
0C	RECEIVE MODE	37	7	68	STATION 5
20	MENU	38	8	1E	JOG (RIGHT)
22	HELP	39	9	1F	JOG (LEFT)
24	DIRECTORY	ЗА	0		
25	▲ VOLUME	3B	*	00	NO INPUT
26	▼ VOLUME	3C	#	01	STOP

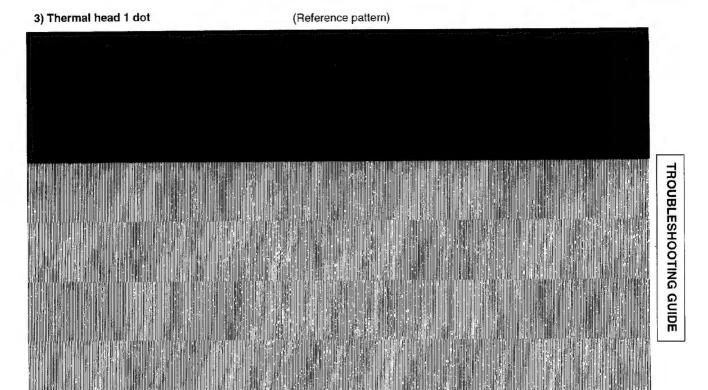
Note: These codes (00, 01) are only for the data in the History Report.

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2) Left margin/Top margin

(Reference pattern)

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	about 2.5 cm
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MEMO

ADJUSTMENTS

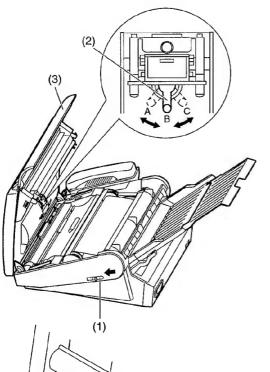
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1. Table of Test Equipment and Tools	113
2. Adjusting the Feeder Pressure	113
3. Confirming the Separation Spring	113
4. CCD Adjustments	114~117
5. Document Bead Start Position Adjustment	119

1. TABLE OF TEST EQUIPMENT AND TOOLS

No.	Test Equipment and Jig Name	Jig No.
1	Oscilloscope	
2	CCD Tool	PFZZ1F780M
3	Extension Cord	PQZZ2K12Z, PQZZ8K18Z
4	Spring Height Tool	PFZZ2FP200M

2. ADJUSTING THE FEEDER PRESSURE

If misfeeding of a document such as multiple feeding or no feeding occurs frequently, try to adjust the feeder pressure by following the steps below.



- (1) Slide the cover open lever forwards to open the front cover.
- (2) Shift the position of the lever by using an instrument with a pointed end, like a clip or ball-point pen. Position A: Select this when documents are not fed. Position B: Standard position (pre-selected) Position C: Select this when documents multiple feed.
- (3) Close the front cover securely by pushing down on both ends.

3. CONFIRMING THE SEPARATION SPRING

- 1. Open the front cover.
- Check the highest level of the separation spring with the spring height tool (PFZZ2FP200M). Please make sure that the separation spring does not touch the tool during this operation. (Both right and left) (See Fig. 1.)
- Check the lowest level of the separation spring with the opposite side of the spring height tool. Please make sure that the separation spring does touch the tool during this operation. (See Fig. 2.)

Note: Be careful not to bend the separation spring.

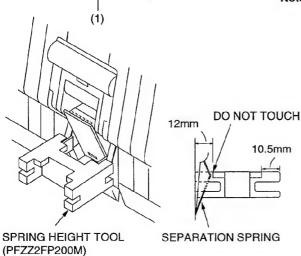
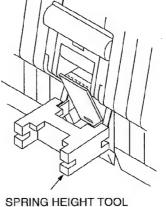
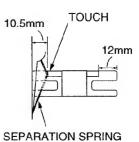


Fig. 1





SPRING HEIGHT TO (PFZZ2FP200M)

Fig. 2

4. CCD ADJUSTMENTS

To obtain good print quality, perform the following adjustments after replacing the lens and/or CCD board.

4.1 PREPARATION:

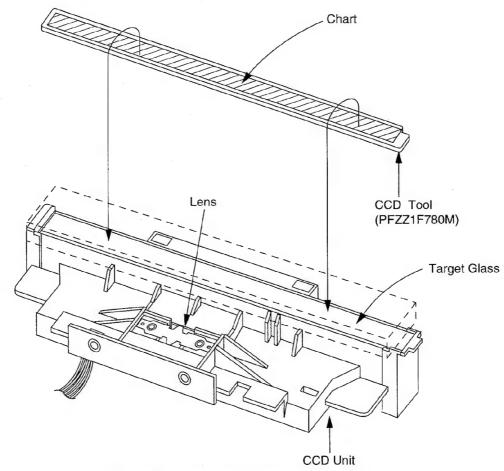
- 1) Remove the CCD board from the unit. (Refer to page 128.)
- 2) Connect the oscilloscope as shown on page 115.
- 3) Attach the CCD TOOL on the CCD unit.
- 4) Connect the CCD unit and the digital board with the extension cord (Part No. PQZZ8K18Z).
- 5) Connect the LED array and the digital board with the extension cord (Part No. PQZZ2K12Z).
- 6) Connect the AC cord.
- 7) Press the MENU button.
- 8) Press the #,9,0,0,0, and \times buttons.
- 9) Press 5 three times.

Note:

- 1. Install the lens so that the marking (RED) is facing up.
- 2. Do not touch the glass face of the lens with bare hands.
- 3. If you do not have an instrument to repair the unit, cut out the chart on page 117, then attach it to the target glass (This is a temporary adjustment. You should use a CCD Tool for proper repair.)

Cleaning:

If the lens is dirty, clean it with a soft dry cloth.



Note:

When adjusting, cover the top of the lens with your hands in order to not let in any light.

LENS AND CCD READ POSITION ADJUSTMENT

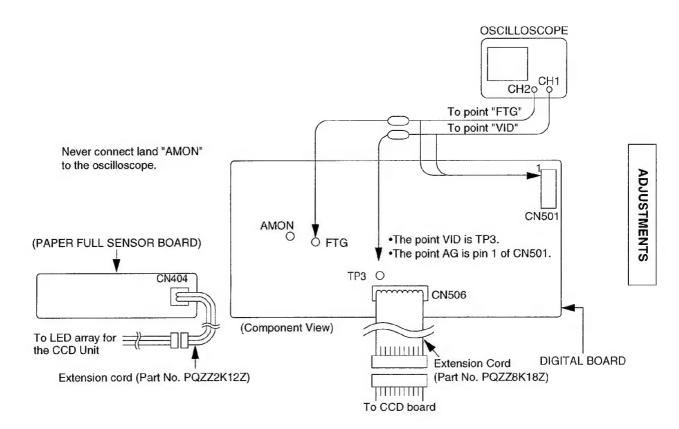
- 1) Loosen the lens screws and CCD board screws.
- 2) Adjust the position of the lens and CCD board so that the waveform appears as shown in the figure below.
- 3) Tighten the lens screws and CCD board screws.

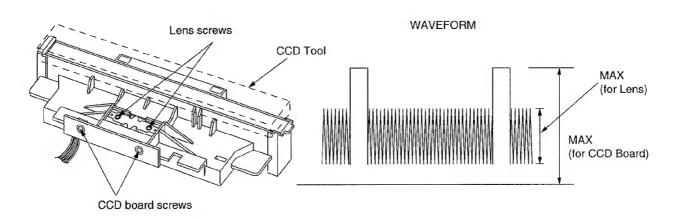
Note: Make sure to observe the instructions in notes 1 and 2 on the preceding page.

Generally, the lens is first temporarily secured and the CCD board is positioned.

Then the optimum lens position is selected.

Oscilloscope setting				
CH1 0.5 V/div				
CH2 2 V/div				
TIME 1 ms				
Trigger CH2				
Mode AC				





4.2 ADJUSTMENT

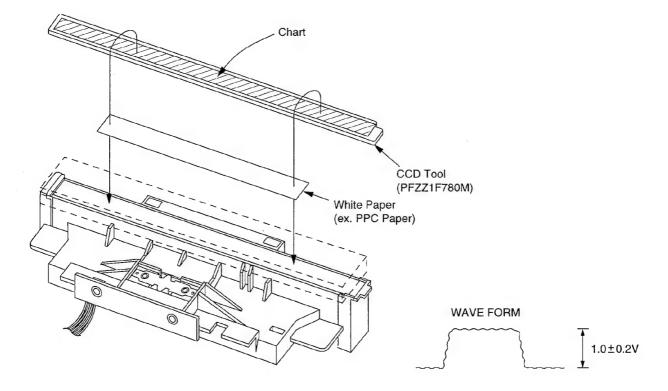
WHITE LEVEL ADJUSTMENT

- 1) Remove the CCD TOOL from the CCD unit.
- 2) Attach the white paper to the CCD unit.3) Attach the CCD TOOL to the CCD unit.
- 4) Adjust VR801 on the CCD board so that the waveform becomes 1.2 \pm 0.2V.

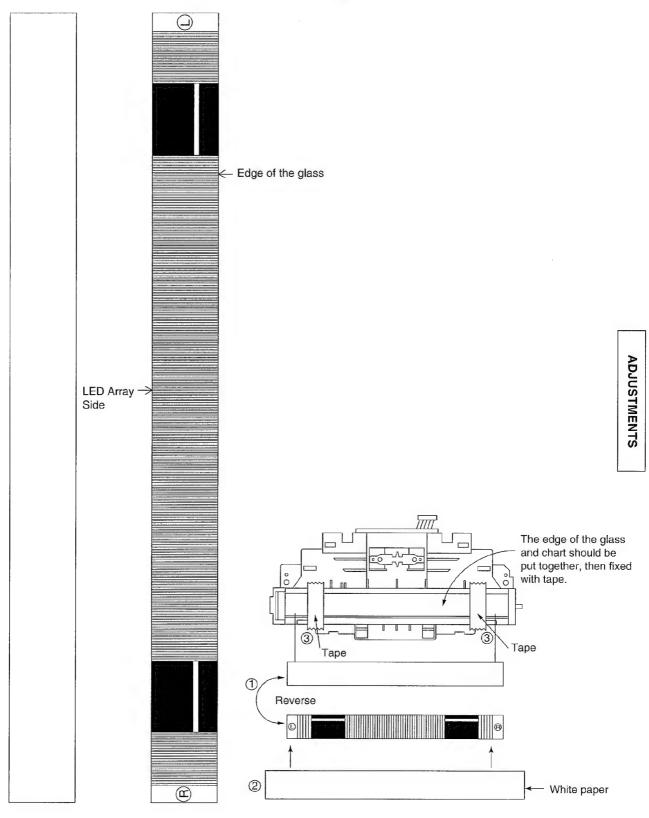
Note: 1. After the adjustment is finished, assemble the unit by reversing the procedure above.

- 2. While making adjustments, cover the top of the lens (such as a thick piece of paper) to prevent light from entering.
- 3. If you do not have an instrument to repair the unit, cut out the chart on the next page, then attach it to the target glass.

(This is a temporary adjustment. You should use a CCD Tool for this for accurate repair.)



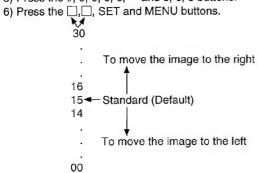
(For white level adjustment) (For lens and CCD read position adjustment)



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5. DOCUMENT READ START POSITION ADJUSTMENT

- 1) Connect the AC cord.
- 2) Copy the document and confirm the read start position of the document. Compare the printed result with the original document.
- 3) If out of position, adjust the read position.
- 4) Press the MENU button.
- 5) Press the #, 9, 0, 0, 0, and 5, 6, 3 buttons.

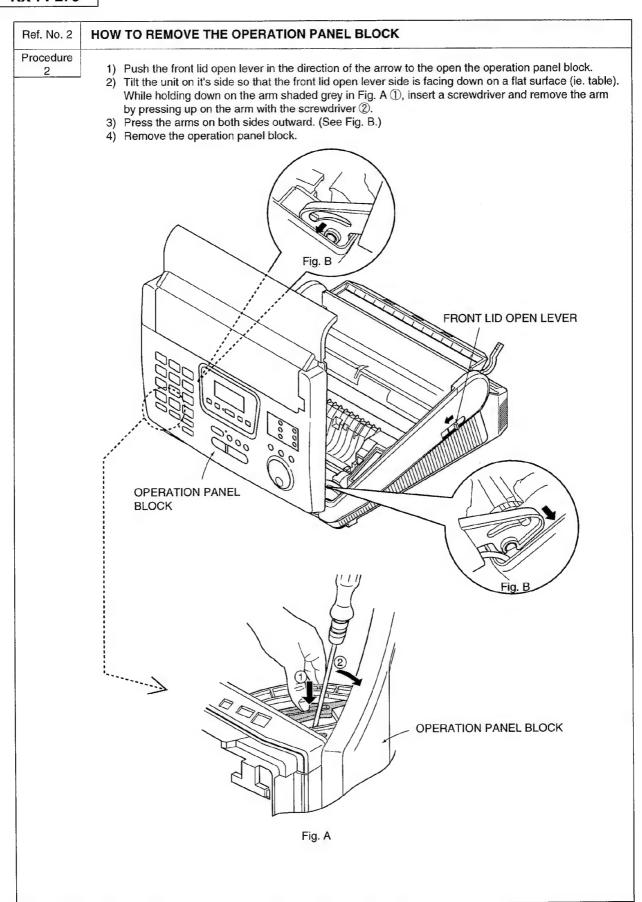


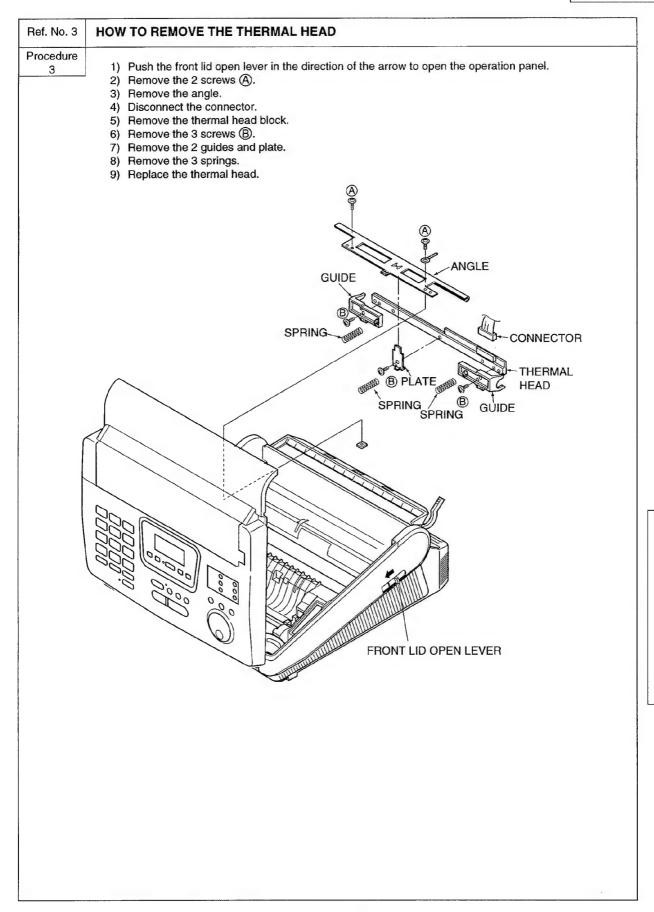
The read start position shifts 1 mm for each number.

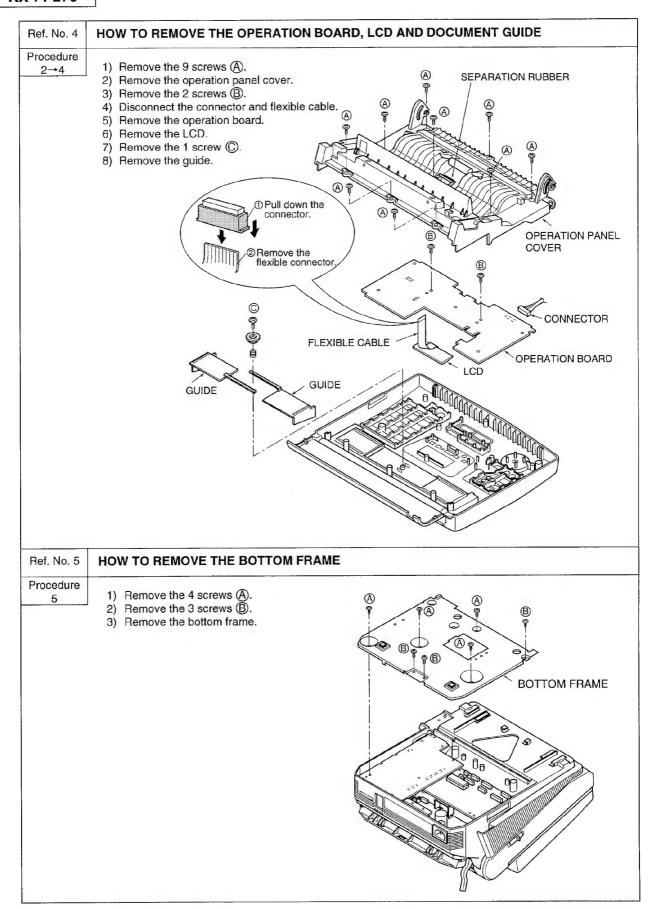
DISASSEMBLY INSTRUCTIONS

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4. How to Remove the Operation Board, LCD and Document Guide 124
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13. How to Remove the Document Tray 131
14. How to Replace Flat Package IC

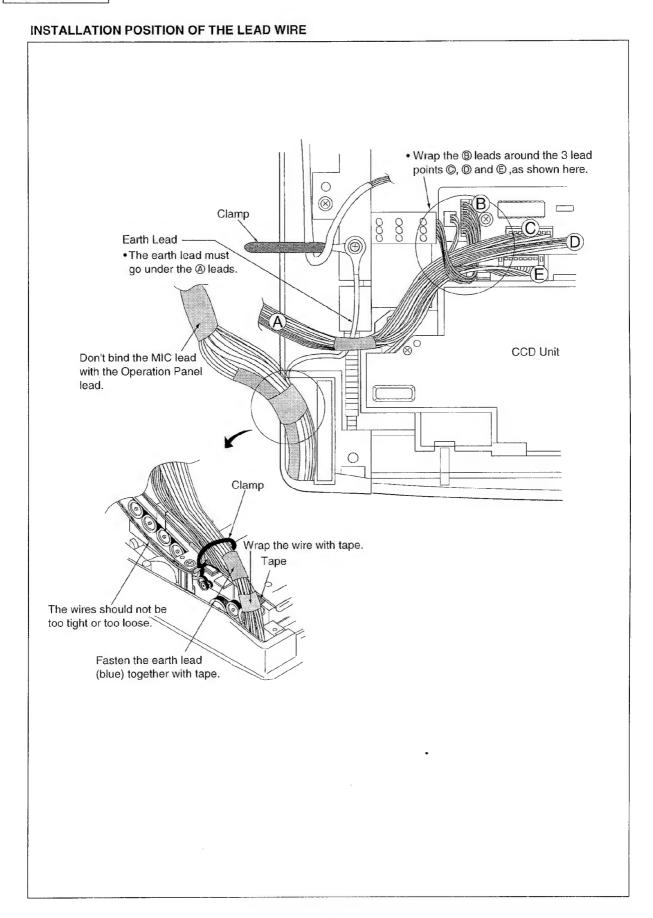
HOW TO REMOVE THE HANDSET CRADLE, SPEAKER AND HOOK SWITCH BOARD Ref. No. 1 Procedure ·Remove accessories, such as the cassette tray and power cord, before disassembling the unit. Remove the screw (A). Remove the 2 screws (B). 3) Remove the bottom frame. (See Ref. No.5.) 4) Remove the handset cradle. 5) Remove the 3 screws ©. 6) Remove the speaker.7) Remove the 1 screw ①. 8) Remove the connector. 9) Remove the hook switch board. HANDSET CRADLE CONNECTOR - HOOK SWITCH BOARD SPEAKER

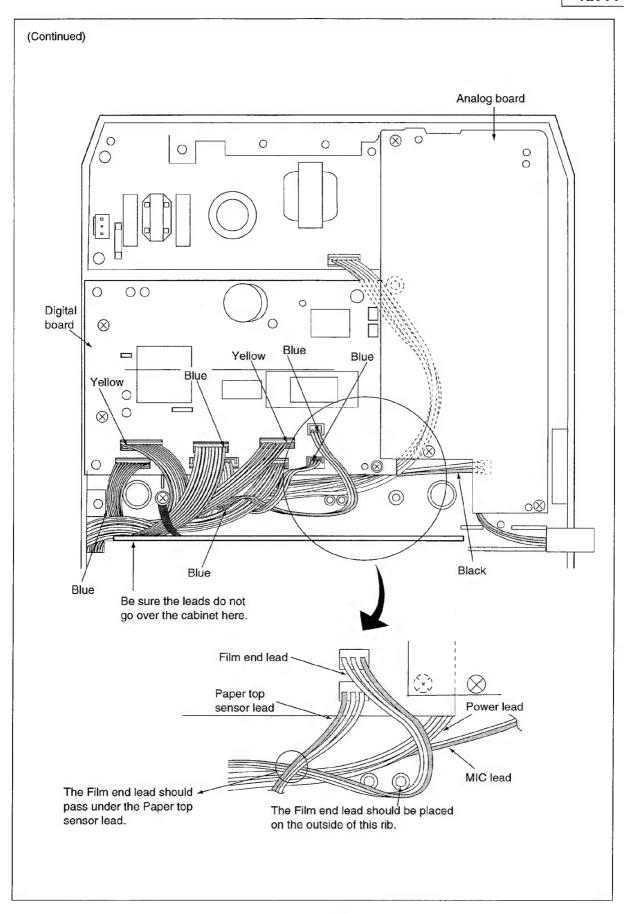






HOW TO REMOVE THE ANALOG, DIGITAL, POWER SUPPLY, PAPER TOP SENSOR BOARDS Ref. No. 6 AND AC INLET Procedure 5→6 1) Remove the 3 screws (A). 8) Remove the 4 screws (D. 2) Remove the analog board. 9) Remove the 1 screw (E). 10) Disconnect the 2 connectors-C. Disconnect the 3 connectors-A. 4) Remove the 8 connectors-B. 11) Remove the power supply board. 5) Remove the 2 screws (B). 12) Remove the AC inlet. 13) Remove the paper top sensor board. 6) Remove the 2 screws (C). 7) Remove the digital board. CONNECTOR-A CONNECTOR-A ANALOG BOARD CONNECTOR-B PAPER TOP SENSOR CONNECTOR-C DIGITAL BOARD BOARD AC INLET CONNECTOR-C SENSOR BOARD TOOL (PFZZFP200M) 3) (Setting example) PAPER TOP SENSOR BOARD Use a sensor board tool when you set and remove the paper top sensor NOTE: Refer to pages 126 and 127 for the installation position of the lead wire.





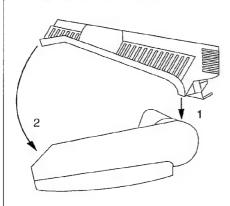
HOW TO REMOVE THE LOWER CABINET AND FILM END SENSOR BOARD Ref. No. 7

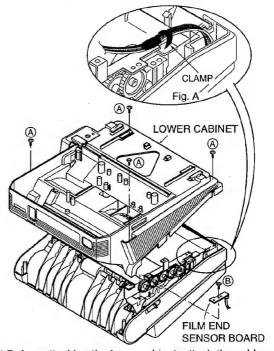
Procedure 1→5→6→7

- Remove the 4 screws (A).
- 2) Remove the lower cabinet.
- 3) Remove the 1 screw (B).
- 3) Remove the film end sensor board.

NOTE:

When you close the lower cabinet, insert the back side first then set the front side.



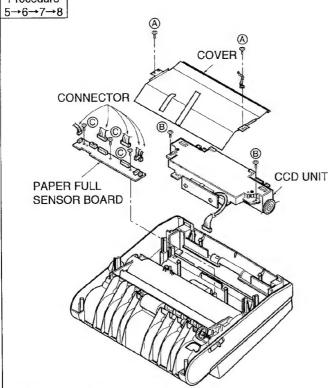


* Before attaching the lower cabinet, attach the cables exposed from the upper cabinet to the clamp. (Fig. A)

HOW TO REMOVE THE CCD UNIT AND PAPER FULL SENSOR BOARD

Procedure

Ref. No. 8



HOW TO CLEAN:

Clean the target glass on the CCD unit with a cloth soaked in alcohol.

(CCD UNIT)

- 1) Remove the 2 screws (A).
- 2) Remove the cover.
- 3) Remove the 2 screws (B).
- 4) Remove the CCD UNIT.

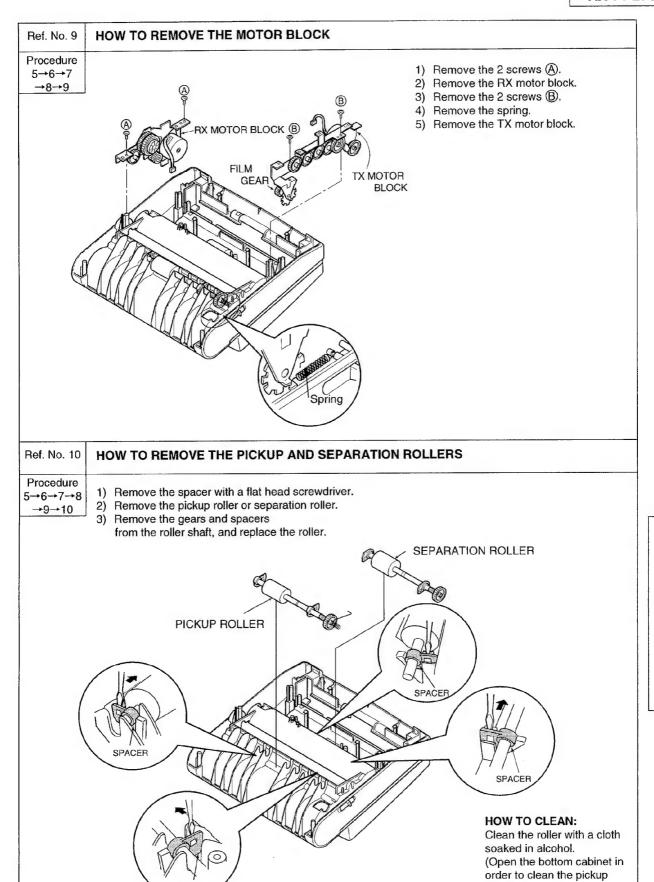
(PAPER FULL SENSOR BOARD)

- 1) Disconnect the 5 connectors.
- 2) Remove the 3 screws ©.
- 3) Remove the paper full sensor board.

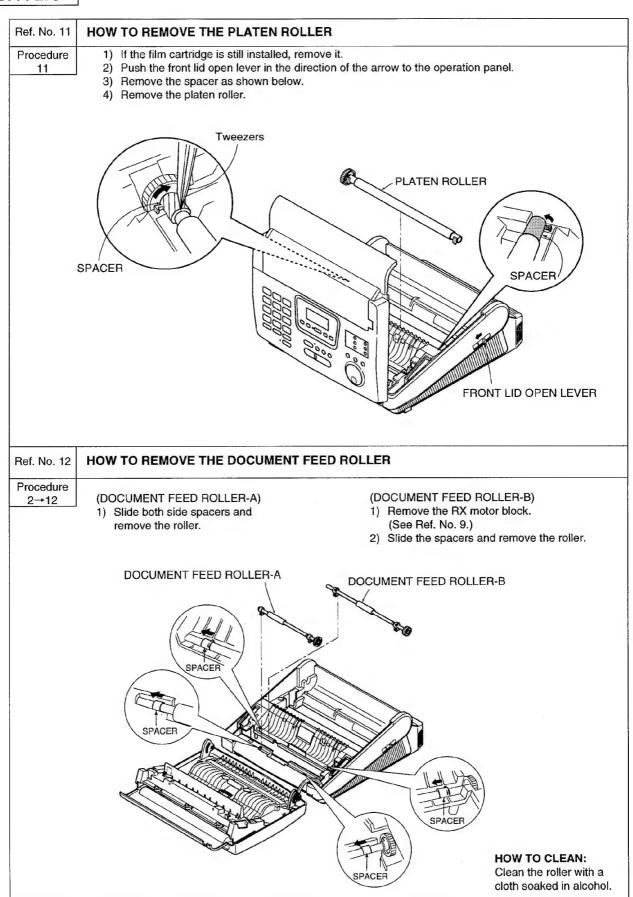


Note:

When assembling, tie the lead lines together as shown above, to prevent them from being caught in the cabinet.



roller.)



		KA-FFZ
Ref. No. 13	HOW TO REMOVE THE DOCUMENT TRAY	
Procedure 13	Push the center section in the direction of the arrow to remove the document tray.	
	DOCUMENT TRAY	

HOW TO REPLACE THE FLAT PACKAGE IC

If you do not have the special tools (for example, SPOT HEATER) to remove the SPOT HEATER'S Flat IC, if you have solder (large amount), a soldering iron and cutter knife, you can easily remove the ICs even if there are more than 100 pins.

1. PREPARATION

• SOLDER _ _ _ _ _ Sparkle Solder 115A-1, 115B-1
OR

Almit Solder KR-19, KR-19RMA

· Soldering iron – – – – Recommended power consumption is between 30 W to 40 W. Temperature of Copper Rod 662 \pm 50 $^{\circ}$ F (350 \pm 10 $^{\circ}$ C)

(An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)

• Flux - - - - - - - HI115 Specific gravity 0.863

(Original flux should be replaced daily.)

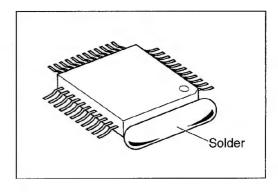
2. FLAT PACKAGE IC REMOVAL PROCEDURE

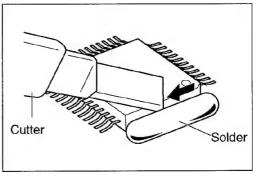
1) When all of the IC leads cannot been seen at the standard degree, fill with large quantities of solder.

Note:

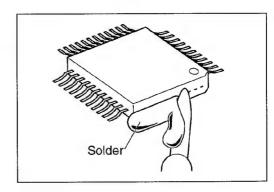
If you do not fill with solder and directly cut the IC lead with the cutter, stress may build up directly in the P.C. board's pattern. If you do not fill with large quantities of solder as in step 1, the P.C. board pattern may be removed.

Using a cutter, cut the lead at the source.
 (Cut the contents with a cutter lightly, 5 or 6 times.)





Remove when the solder melts.(Remove the lead at the same time.)



After removing the Flat IC and when attaching a new IC, remove any of the excess solder on the land using the soldering wire, etc. If the excess solder is not removed from the land, the IC will slip and not be attached properly.

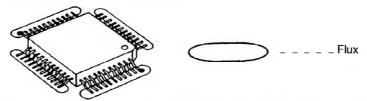
3. FLAT PACKAGE IC INSTALLATION PROCEDURE

1) Temporarily fix the FLAT PACKAGE IC by soldering on the two marked pins.

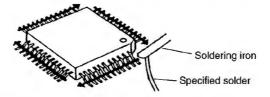


*Check the accuracy of the IC setting with the corresponding soldering foil.

2) Apply flux to all pins of the FLAT PACKAGE IC.

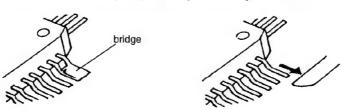


3) Solder using the specified solder, in the direction of the arrow, by sliding the soldering iron.



4. BRIDGE MODIFICATION PROCEDURE

- 1) Lightly resolder the bridged portion.
- 2) Remove the remaining solder along the pins using a soldering iron as shown in the figure below.

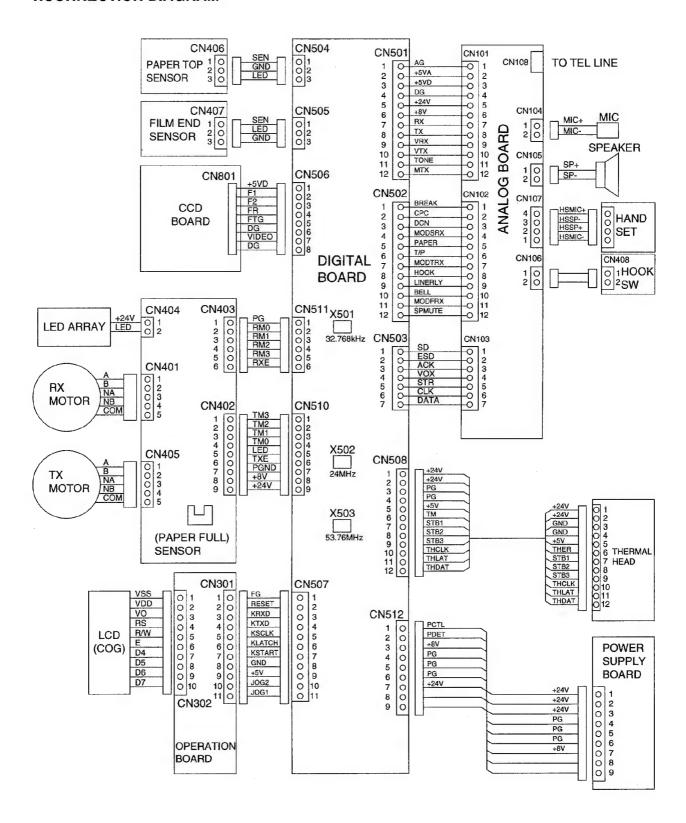


MEMO

CIRCUIT OPERATIONS

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9. ATAS Section	175
10. Analog Gate Array	176, 177
11. Operation Board Section	1 78
12. LCD Section	179
13. Power Supply Board Switching Section	180~182

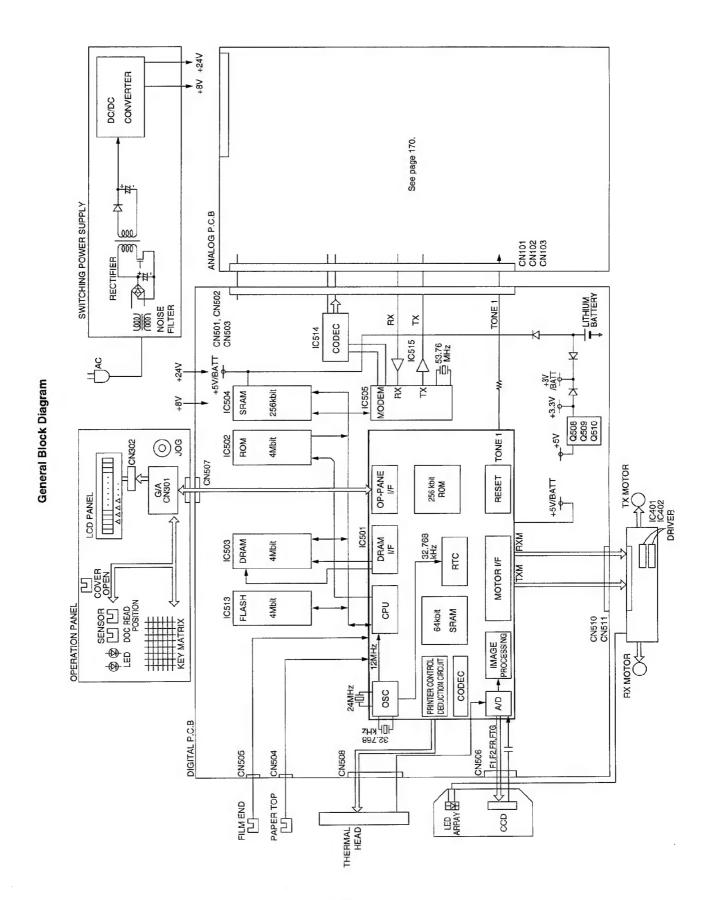
1.CONNECTION DIAGRAM



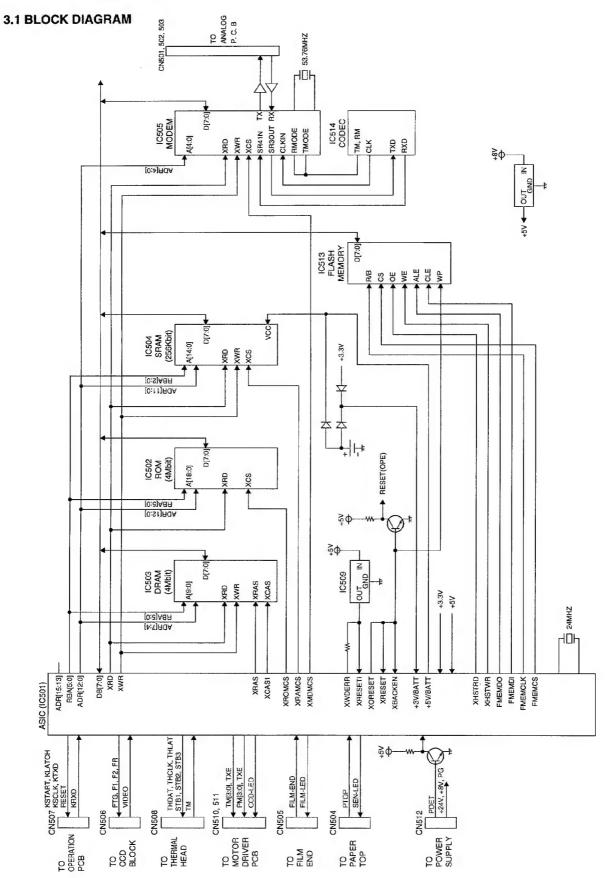
2. GENERAL BLOCK DIAGRAM

The control section will be explained as shown in the block diagram.

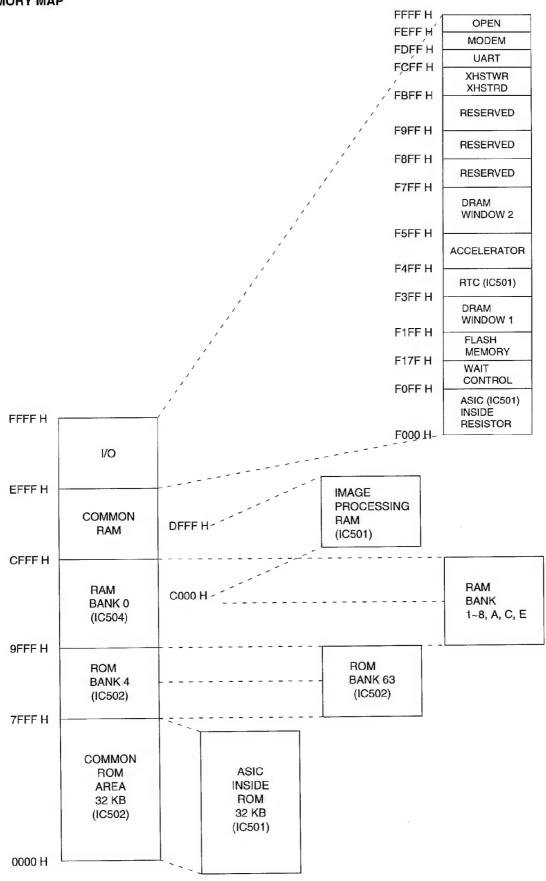
1) ASIC (IC501)	. Composed mainly of an address decoder and modem control section. Controls the general FAX operations.
	J .
	Controls the operation panel I/F.
	Controls the thermal head I/F and CCD I/F.
	Executes image processing.
	CPU and Real time clock
	Provides the reset pulse to each of the major ICs.
2) ROM (IC502)	. Contains all of the program instructions for unit operations.
	. This memory is used mainly for the parameter working storage area.
4) Dynamic RAM (IC503)	. This memory is used mainly for the parameter working storage area.
5) MODEM (IC505)	
6) Read Section	. CCD image sensor to read transmitting documents.
7) Motor Driver (IC401,IC402)	. Drives the transmission motor and the reception motor.
8) Thermal Head	. Contains heating elements for dot matrix image printing.
9) Analog Board	
	. Composed of a cover open sensor, document sensor, read position sensor,
	set paper switch, paper full sensor, paper top sensor and film end sensor.
11) Power Supply Board Switching Section	. Supplies +8V and +24V to the unit.
12) Flash Memory (IC513)	



3. CONTROL SECTION



3.2 MEMORY MAP



CIRCUIT OPERATIONS

3.3 ASIC (IC501)

This custom IC is used for general FAX operations.

(1) CPU:

This model uses a Z80 equivalent CPU operating at 12 MHz. Many of the peripheral functions are handled by custom designed LSIs.

As a result, the CPU only needs to process the results.

(2) RTC: Real time clock.

(3) DECODER: Decodes the address.

(4) ROM/RAM I/F: Controls the SELECT signal of ROM or RAM and bank switching.

Controls document reading. (5) CCD I/F:

This is inside the ASIC and has 8 KB which is used for image processing. (6) IMAGE DATA RAM:

(7) THERMAL HEAD I/F: Transmits the recorded data to the thermal head.

Controls the transmission motor which feeds the document. (8) MOTOR I/F:

Controls the receiving motor which feeds the recording paper.

Serial interface with Operation Panel. (9) OPERATION PANEL I/F:

(10) I/O PORT: I/O Port Interface.

Electronic volume for the handset and monitor. (11) ANALOG UNIT:

Sends beep tones, etc.

This memory is built-in to the ASIC (IC501) to be used for image processing. The memory map of the Image Data RAM is shown below.

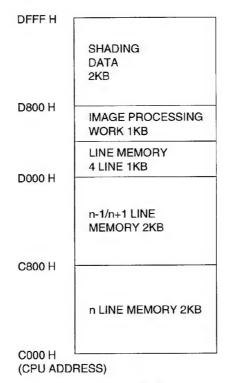


Fig. A

3.4 ROM (IC502)

This 512 KB ROM (EPROM or MASKROM) has 32 KB of common area and bank area (BK4~BK63).

The capacity of each bank is 8 KB.

The addresses of the common area are from 0000H to 7FFFH, and addresses 8000H to 9FFFH are for the bank area.

3.5 STATIC RAM (IC504)

This 32 KB RAM has 8 KB of common area and bank area (BK0~BK8, A, C, E).

The capacity of each bank is 12 KB.

The addresses of the common area are from D000H to EFFFH, and the addresses A000H to CFFFH are for the bank area.

3.6 DYNAMIC RAM (IC503)

The DRAM is used for CPU work and receiving memory.

The address is F200H~F3FFH (DRAM access window 1) and F600H~F7FFH (DRAM access window 2).

Explanation of Pin Distribution (IC501)

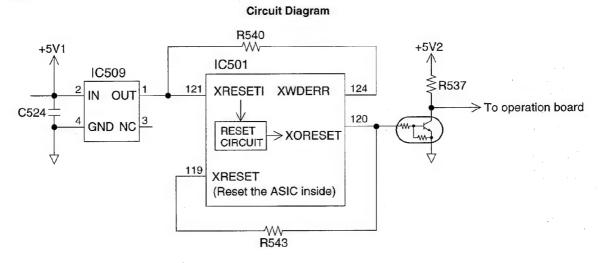
NO.	SIGNAL	1/0 F	OWER SUPPLIED VOLTAGE	EXPLANATION
1	AIN1	A	3.3V	CCD IMAGE SIGNAL INPUT
2	AIN2	A	3.3V	THERMISTOR TEMPERATURE WATCH INPUT
3	AMON	A	3.3V	ANALOG SIGNAL MONITOR TERMINAL
4	VSSB		GND	POWER SOURCE (ANALOG GND)
<u>.</u> 5	VDDB		3.3V	POWER SOURCE (ANALOG +3.3V)
6	VDD (3.3V/B)	+	3.3V/BATT	POWER SOURCE (+3.3V/LITHIUM BATTERY)
7	X32OUT	0	3.3V/BATT	RTC (32.768KHz) CONNECTION
8	X32IN	1	3.3V/BATT	RTC (32.768KHz) CONNECTION
9	VSS	·	GND	GND
10	XBACEN		5V/BATT	BACKUP ENABLE
11	VDD (5V/B)	+	5V/BATT	POWER SOURCE (+5V/LITHIUM BATTERY)
12	XRAMCS	0	5V/BATT	RAM (IC504) CHIP SELECT
13	FTG	0	5V	SH SIGNAL OUTPUT FOR CCD
14	F1	0	5V	01 SIGNAL OUTPUT FOR CCD
15	F2	0	5V	02 SIGNAL OUTPUT FOR CCD
16	FR	0	5V	RS SIGNAL OUTPUT FOR CCD
17	VIDRST	11	5V	INPUT PORT (ESD)
18	SPHCLK	1	5V	INPUT PORT (VOX)
19	DARKON	0	5V	OUTPUT PORT (MODSRX)
	ADSEL2	1 1	5V	INPUT PORT (SD)
20	CPC		5V	INPUT PORT (DCN)
	BELL	0	5V 5V	OUTPUT PORT (CCD LED ON)
22		1 0	5V 5V	POWER SOURCE (+5V)
23	VDD (5V)	+ +		POWER SOURCE (#5V) POWER SOURCE (GND)
24	VSS	+ . +	GND	
25	RVN	1	5V	INPUT PORT (FILM END SENSOR SIGNAL)
26	TXD	0	5V	NOT USED
27	RXD	0	5V	NOT USED
28	XRTS	0	5V	NOT USED
29	XCTS	0	5V	NOT USED
30	XDSR	0	5V	NOT USED
31	DCD	0	5V	NOT USED
32	XDTR	0	5V	NOT USED
33	RI	0	5V	
34	TONE1		5V	TONE OUTPUT
35	TONE2		5V	NOT USED
36	VOL1		5V	NOT USED
37	VOL2		5V	NOT USED
38	VOL3		5V	NOT USED
39	MIDAT	0	5V	ANALOG ASIC I/F (DATA)
40	MICLK	0	5V	ANALOG ASIC I/F (CLK)
41	MILAT	0	5V	ANALOG ASIC I/F (LATCH)
42	XRESCS1	0	5V	OUTPUT PORT (BREAK)
43	XRESCS2	0	5V	OUTPUT PORT (MODEM RESET)
44	VSS		GND	POWER SOURCE (GND)
45	VDD (5V)		5V	POWER SOURCE (+5V)
46	XNMI	1	5V	HIGH FIXED
47	CBUSY2	0	5V	OUTPUT PORT (LINE RLY)
48	CSO	0	5V	OUTPUT PORT (CCD ON)
49	CBUSY1	1	5V	INPUT PORT (JOG1)
50	CCLK	1	5V	INPUT PORT (JOG2)
51	CSI	ı	5V	INPUT PORT (VOX)
52	XMDMINT	I	5V	MODEM INTERRUPT
53	XMDMCS	0	5V	MODEM CHIP SELECT

NO.	SIGNAL	1/0	POWER SUPPLIED VOLTAGE	EXPLANATION
54	XRESCS3	0	5V	OUTPUT PORT (FILM SENSOR LED ON)
55	20KOSC	1/0	5V	NOT USED
56	XHOLDAK	0	5V	NOT USED
57	VDD (3.3V)		3.3V	POWER SOURCE (+3.3V)
58	XOUT	0	3.3V	SYSTEM CLOCK (24MHz)
59	XIN		3.3V	SYSTEM CLOCK (24MHz)
60	VSS		GND	POWER SOURCE (GND)
61	VDD (5V)		5V	POWER SOURCE (+5V)
62	XTEST	0	5V	24MHz CLOCK
63	CPUCLK	0	5V	NOT USED
64	TEST1		5V	HIGH FIXED
65	TEST2		5V	HIGH FIXED
66	TEST3	l i	5V	HIGH FIXED
67	TEST4	l i	5V	HIGH FIXED
68	XWAIT	l i	5V	LOW FIXED
69	HOLD	i	5V	LOW FIXED
70	VSS		GND	POWER SOURCE (GND)
71	VDD (3.3V)		3.3V	POWER SOURCE (3.3V)
72	HSTRD	0	5V	FLASH MEMORY READ
73	HSTWR	0	5V	FLASH MEMORY WRITE
74	XOPRBE	0	5V	OUTPUT PORT (ACK)
75	ADR15	0	5V	CPU ADDRESS BUS 15 (NOT USED)
		0	5V	CPU ADDRESS BUS 14 (NOT USED)
76	ADR14	0	5V	CPU ADDRESS BUS 13 (NOT USED)
77	ADR13	0	5V	DRAM (IC503) ROW ADDRESS STROBE
78	XRAS		5V	DRAM (IC503) NOW ADDRESS STROBE DRAM (IC503) CULUM ADDRESS STROBE
79	XCAS1	0	5V	OUTPUT PORT (PCTL)
80	XCAS2			CPU DATA BUS 3
81	DB3	1/0	5V	
82	DB2	1/0	5V	CPU DATA BUS 2 CPU DATA BUS 4
83	DB4	1/0	5V	
84	DB1	1/0	5V	CPU DATA BUS 5
85	DB5	1/0	5V 5V	CPU DATA BUS 5
86	DB0	1/0		CPU DATA BUS 6
87	DB6	1/0	5V	CPU DATA BUS 6 CPU DATA BUS 7
88	DB7	1/0	5V	
89_	XROMCS	1/0	5V	ROM (IC502) CHIP SELECT
90			GND	POWER SOURCE (GND)
91	VDD (5V)		5V	POWER SOURCE (+5V)
92	RD	0	5V	CPU RD
93	WR	0	5V	CPU WR
94	ADR0	0	5V	CPU ADDRESS BUS 0
95	ADR1	0	5V	CPU ADDRESS BUS 1
96	ADR2	0	5V	CPU ADDRESS BUS 2 CPU ADDRESS BUS 3
97	ADR3	0	5V	CPU ADDRESS BUS 3
98_	ADR4	0	5V	
99	ADR5	0	5V	CPU ADDRESS BUS 5
100	ADR6	0	5V	CPU ADDRESS BUS 6
101	ADR7	0	5V	CPU ADDRESS BUS 7
102	ADR8	0	5V	CPU ADDRESS BUS 8
103	ADR9	0	5V	CPU ADDRESS 9
104	ADR10	0	5V	CPU ADDRESS 10
105	ADR11	0_	5V	CPU ADDRESS 11
106	ADR12	0	5V	CPU ADDRESS 12

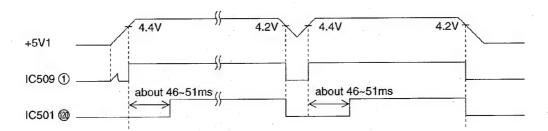
NO.	SIGNAL	1/0	POWER SUPPLIED VOLTAGE	EXPLANATION
107	RBA0	0	5V	ROM/RAM BANK ADDRESS 0
108	VSS		GND	POWER SOURCE (GND)
109	VDD (5V)		5V	POWER SOURCE (+5V)
110	RBA1	0	5V	ROM/RAM BANK ADDRESS 1
111	RBA2	0	5V	ROM/RAM BANK ADDRESS 2
112	RBA3	0	5V	ROM/RAM BANK ADDRESS 3
113	RBA4	0	5V	ROM/RAM BANK ADDRESS 4
114	RBA5	0	5V	ROM/RAM BANK ADDRESS 5
115	FMEMCS	0	5V	OUTPUT PORT (FCS)
116	FMEMDO	0	5V	OUTPUT PORT (ALE)
117	FMEMDI	0	5V	OUTPUT PORT (CLE)
118	FMEMCLK	i	5V	INPUT PORT (R/B)
119	XRESET	i	5V	RESET INPUT
120	XORESET	0	5V	RESET OUTPUT
121	XRESETI	Ĭ	5V	RESET INPUT
122	VDD (5V)	<u> </u>	5V	POWER SOURCE (+5V)
123	VSS		GND	POWER SOURCE (GND)
124	WDERR	0	5V	WATCHED ERROR OUTPUT SIGNAL
125	IOP	0	5V	THERMAL HEAD POWER ON/OFF CONTROL
126	RM0	0	5V	RECEIVE MOTOR A PHASE
127	RM1	0	5V	RECEIVE MOTOR B PHASE
128	RM2	0	5V	RECEIVE MOTOR /A PHASE
129	RM3	0	5V	RECEIVE MOTOR /B PHASE
130	RXE	0	5V	RECEIVE MOTOR ENABLE SIGNAL
	TMO	0	5V	TRANSFER MOTOR A PHASE
131		0	3.3V	POWER SOURCE (3.3V)
132	VDD (3.3V) VSS		GND	POWER SOURCE (GND)
133			5V	TRANSFER MOTOR B PHASE
134	TM1 TM2	0	5V	TRANSFER MOTOR /A PHASE
135			5V	TRANSFER MOTOR /B PHASE
136	TM3	0	5V	TRANSFER MOTOR ENABLE SIGNAL
137	TXE	0	5V	STROBE SIGNAL OUTPUT TO THERMAL HEAD
138	STB1	0	5V	STROBE SIGNAL OUTPUT TO THERMAL HEAD
139	STB2	0	5V	STROBE SIGNAL OUTPUT TO THERMAL HEAD
140	STB3	0	5V	NOT USED
141	STB4	0		
142	VDD (5V)		5V	POWER SOURCE (+5V)
143	VSS		GND	POWER SOURCE (GND)
144	STBNP		5V	INPUT PORT (CPC)
145	THDAT	0_	5V	RECORDED IMAGE OUTPUT
146	THCLK	0	5V	CLOCK OUTPUT FOR DATA LATOU
147	THLAT	0	5V	PULSE OUTPUT FOR DATA LATCH
148	KSTART	0	5V	OPERATION PANEL CONTROL
149	KLATCH	0	5V	OPERATION PANEL CONTROL
150	KSCLK	0	5V	OPERATION PANEL CONTROL
151	KTXD	0	5V	OPERATION PANEL CONTROL
152	KRXD		5V	OPERATION PANEL CONTROL
153	ADSEL1	0	5 V	CHANNEL SELECT SIGNAL FOR AIN2
154	VSSC		GND	POWER SOURCE (ANALOG GND)
155	VDDC		3.3V	POWER SOURCE (ANALOG +3.3V)
156	VSSA		GND	POWER SOURCE (ANALOG GND)
157	VDDA		3.3V	POWER SOURCE (ANALOG +3.3V)
158	VREFB	Α	3.3V	A/D CONVERTER'S ZERO STANDARD VOLTAGE OUTPUT
159	VCL	Α	3.3V	ANALOG PART STANDARD VOLTAGE SIGNAL
160	VREFT	A	3.3V	A/D CONVERTER'S FULL SCALE VOLTAGE OUTPUT

3.8 RESET CIRCUIT (WATCH DOG TIMER)

The output signal from pin 1 of the voltage detect IC (IC509) is input to the ASIC (IC501) 121 pin. Then the output signal from pin 120 of the ASIC (IC501) resets the ASIC, the MODEM (IC505) and the gate array (IC301) on the operation board.



(1) During a momentary power interruption, a positive reset pulse of 46~51 msec is generated and the system is reset completely.



- (2) When pin 119 and 120 of IC501 become low level, they will prohibit the SRAM (IC503) from changing data. The SRAM (IC504) will go into the backup mode, when they are backed up by a lithium battery.
- (3) The watch dog timer, built-in the ASIC (IC501), is initialized by the CPU about every 1.5 ms.

 When a watch dog error occurs, pin 124 of the ASIC (IC501) becomes low level.

 The terminal of the WDERR signal is connected to the reset line, so the WDERR signal works as the reset signal.

3.9 SRAM AND RTC BACK UP CIRCUIT

1) Function

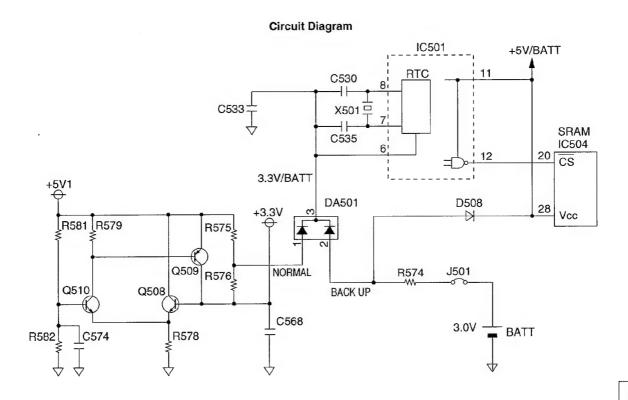
This unit has a lithium battery (BATT) which works for the SRAM (IC504) and Real Time Clock IC (RTC: inside IC501). The user parameters for autodial numbers, the system setup data and so on are stored in the SRAM (IC504). The RTC continues functioning, even when the power switch is OFF, backed up by a lithium battery.

2) SRAM (IC504) Backup Circuit Operation

When the power switch is turned ON, power is supplied through pin 11 of IC501 to the SRAM (IC504). At this time, the voltage at pin 28 of the SRAM is 5V. When the power switch is turned OFF, the BATT supplies power to the SRAM through J501, R574 and D508. The voltage at pin 28 of the SRAM is about +2.5V. When the power switch is OFF and the voltage of +5V decreases, the voltage detect IC (IC509) outputs "Low" level and the IC501 outputs the reset signal. Pin 28 of the SRAM becomes roughly the same voltage as the battery voltage. At this point, pin 20 (CS) of IC504 becomes high level, causing the SRAM to go into the backup mode, in which the power consumption is lower.

3) RTC Inside (IC501) Backup Circuit Operation

When the power switch is turned ON, power is supplied through DA501 to the RTC (inside IC501). At this time, the voltage at pin 6 of the IC501 is +3.3V. When the power switch is turned OFF, the BATT supplies power to RTC through DA501. The voltage at pin 6 of IC501 is about +2.5V. When the power switch is OFF and the voltage of +3.3V decreases, pin 6 of RTC (IC501) becomes roughly the same voltage as the battery voltage. RTC goes into the backup mode, in which the power consumption is lower.



3.10 SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE

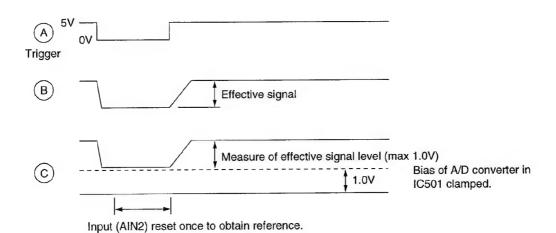
1) Function

The thermistor changes the resistor according to the temperature and uses the thermistor's characteristics. The output of pin 153 of IC501 becomes a low level. Then when it becomes a high level, it triggers point (a). In point (b), according to the voltage output time, the thermal head's temperature is detected.

After the thermal head temperature is converted to voltage in (a), it is then changed to digital data in the A/D converter inside IC501. The CPU decides the strobe width of the thermal head according to this value. Therefore, this circuit can keep the thermal head at an even temperature in order to stabilize the printing density and prevent the head from being overheated.

Circuit Diagram 138 STB₁ 139 STB2 140 STB3 TO THERMAL HEAD 141 STB4 (Refer to page 151.) ASIC 145 **THDAT** 146 **THCLK** 147 **THLAT** 153 ADSEL1 **THERMAL** AIN₂ A/D **HEAD** C503 CN508 R511 ≸ C512 IC501 R512 C510 R527 ≸

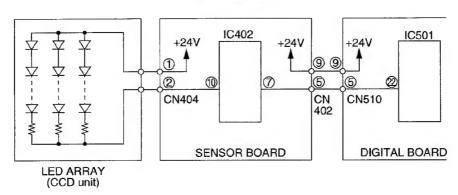
Timing Chart



3.11 LED ARRAY

The LED ARRAY will light during transmission and copying as a light source to recognize document characters, patterns, or graphics on a document. Pin 22 of IC501 is low level while the LED array is lit. It is also possible to light the LED ARRAY in the test mode (SCAN CHECK: Refer to page 105.).

Circuit Diagram



4. FACSIMILE SECTION

4.1 IMAGE DATA FLOW DURING FACSIMILE OPERATION

COPY (Fine, Super-Fine, Half Tone)

- 1) White plate information is read by the CCD (to be used as the reference white level) via route ①, and the result is input to IC501. Refer to the block diagram on the following page.
- 2) In IC501, the data is adjusted to a suitable level for A/D conversion in the Analog Signal Processing Section, and via route ② it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route ③. Then via routes ④ and ⑤, it is stored in RAM as shading data.
- 3) The draft's information that is read by CCD is input to IC501 via route ①. After adjusting it to a suitable level for A/D conversion via route ②, the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. The other side, the shading data which flows from RAM via routes ⑥ and ⑦, is input to the Image Processing Section. After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". Via routes ④ and ⑤, they are stored in RAM.
- 4) The white/black data stored as above via routes ⑥ and ⑧ , is input to the P/S converter. The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route ⑨ and is printed out on recording paper.

Note:

Standard: Reads 3.58 times/mm
Fine: Reads 7.7 times/mm
Super-Fine: Reads 15.4 times/mm

Transmission

- 1) Same processing as COPY items 1) 3).
- 2) The data stored in the RAM of IC501 is output from IC501 via routes ⑥ and ⑩, and is stored in the system bus. Via route ⑪, it is stored in the communication buffer inside DRAM (IC503).
- 3) While retreiving data stored in the communication buffer synchronous with the modem, the CPU (inside IC501) inputs the data to the modem along route ②, where it is converted to serial analog data and forwarded over the telephone lines via the NCU Section.

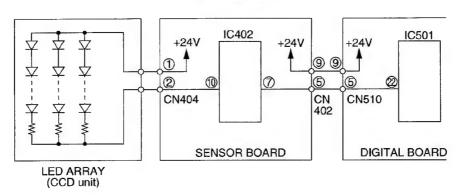
Reception

- 1) The serial analog image data is received over the telephone lines and input to the modern via the NCU section, where it is demodulated to parallel digital data. Then the CPU (IC501) stores the data in the communication buffer DRAM (IC503) along route ②.
- 2) The data stored in DRAM (IC503) is decoded by the CPU (IC501) via route ②, and is stored in DRAM (IC503) via routes ③ and ⑤.
- 3) Same processing as COPY item 4).

3.11 LED ARRAY

The LED ARRAY will light during transmission and copying as a light source to recognize document characters, patterns, or graphics on a document. Pin 22 of IC501 is low level while the LED array is lit. It is also possible to light the LED ARRAY in the test mode (SCAN CHECK: Refer to page 105.).

Circuit Diagram



4. FACSIMILE SECTION

4.1 IMAGE DATA FLOW DURING FACSIMILE OPERATION

COPY (Fine, Super-Fine, Half Tone)

- 1) White plate information is read by the CCD (to be used as the reference white level) via route ①, and the result is input to IC501. Refer to the block diagram on the following page.
- 2) In IC501, the data is adjusted to a suitable level for A/D conversion in the Analog Signal Processing Section, and via route ② it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route ③. Then via routes ④ and ⑤, it is stored in RAM as shading data.
- 3) The draft's information that is read by CCD is input to IC501 via route ①. After adjusting it to a suitable level for A/D conversion via route ②, the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. The other side, the shading data which flows from RAM via routes ⑥ and ⑦, is input to the Image Processing Section. After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". Via routes ④ and ⑤, they are stored in RAM.
- 4) The white/black data stored as above via routes ⑥ and ⑧ , is input to the P/S converter. The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route ⑨ and is printed out on recording paper.

Note:

Standard: Reads 3.58 times/mm
Fine: Reads 7.7 times/mm
Super-Fine: Reads 15.4 times/mm

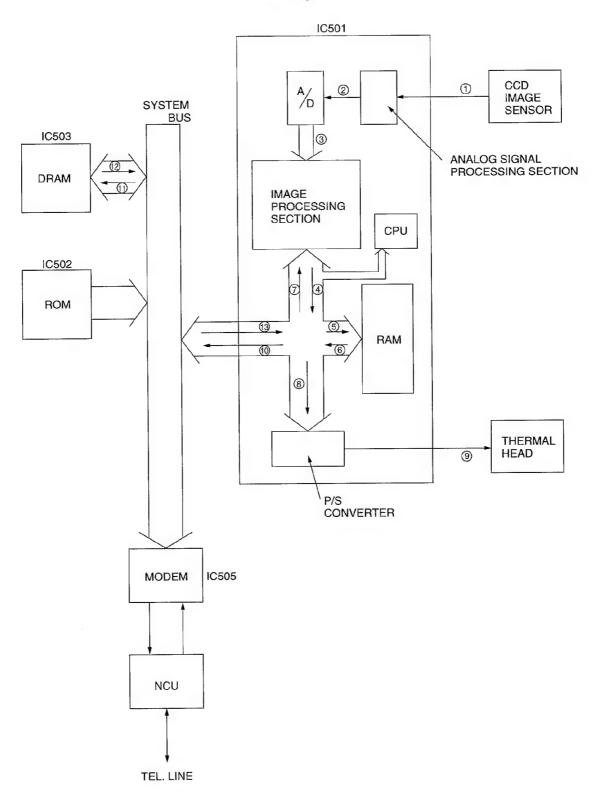
Transmission

- 1) Same processing as COPY items 1) 3).
- 2) The data stored in the RAM of IC501 is output from IC501 via routes ⑥ and ⑩, and is stored in the system bus. Via route ⑪, it is stored in the communication buffer inside DRAM (IC503).
- 3) While retreiving data stored in the communication buffer synchronous with the modem, the CPU (inside IC501) inputs the data to the modem along route ②, where it is converted to serial analog data and forwarded over the telephone lines via the NCU Section.

Reception

- 1) The serial analog image data is received over the telephone lines and input to the modern via the NCU section, where it is demodulated to parallel digital data. Then the CPU (IC501) stores the data in the communication buffer DRAM (IC503) along route ②.
- 2) The data stored in DRAM (IC503) is decoded by the CPU (IC501) via route ②, and is stored in DRAM (IC503) via routes ③ and ⑤.
- 3) Same processing as COPY item 4).

Block Diagram



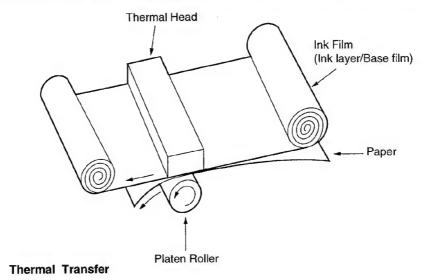
4.2 THERMAL HEAD

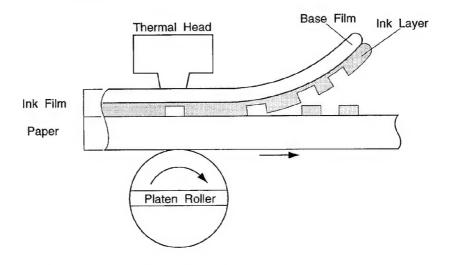
1) Function

This unit utilizes state of the art thermal printer technology.

The ink film is chemically processed. The ink film is comprised of two parts: an ink layer and a base film. When the thermal head contacts this ink film, it emits heat momentarily, and the ink layer is melted and transferred to the paper. If this continues, letters and/or diagrams appear, and the original document is reproduced.

COMPOSITION OF THE RECEIVE RECORD SECTION (THERMAL RECORDING FORMAT)





2) Circuit Operation

Refer to the block diagram and the timing chart on the following page.

There are 27 driver ICs aligned horizontally on the thermal head and each one of these ICs can drive 64 heat emitting registers. This means that one line is at a density of 64×27=1728 dots=(8 dots/mm).

White/Black (white=0, black=1) data in one line increments is synchronized at IC501 pin 146 (THCLK), and sent from IC501 pin 145 (THDAT) to the shift register of the ICs. The shift registers of the 27 ICs are connected in series, and upon the shift of the 1728 dot increment, the shift register becomes filled with data, and a latch pulse is emitted to each IC from IC501 pin 147 (THLAT). With this latch pulse, all the contents of the shift registers are latched to the latch registers. Thereafter, through the addition of strobes from the IC501 pins (138, 139, 140), only the dot location of black (=1) among latched data activates the driver, and the current passes to heat the emitting body to cause heat emission.

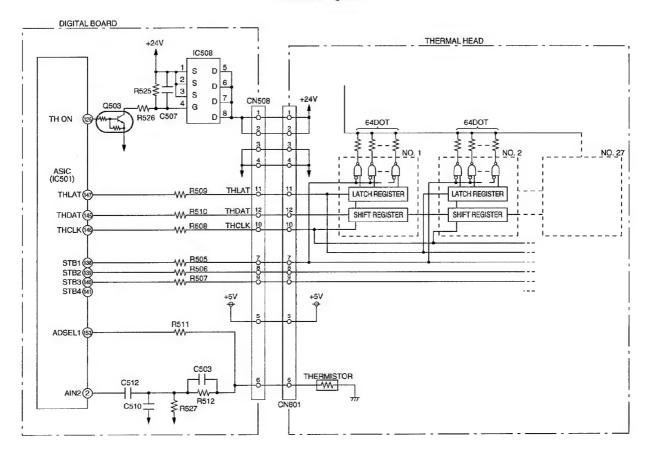
Here, the three line strobes, STB1 to STB3, impress at intervals of 9.216 msec ,as required for one-line printout.

The sequence is shown on the next page. [Moreover, for the strobe width, the thermistor value inside the thermal head is detected according to IC501 pin 2. Depending on that value, the strobe width is recorded in ROM (IC502).

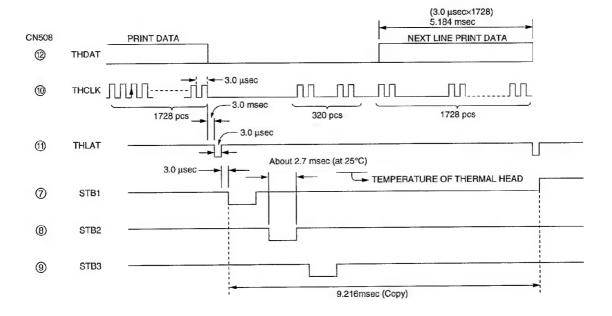
Accordingly, the strobe width is determined.]

When the thermal head is not used, the IC501 (125, THON) becomes low, Q503 turns OFF, IC508 turns OFF, and the +24V power supply for the thermal head driver is not impressed to protect the IC.

Circuit Diagram



Timing Chart



CIRCUIT OPERATIONS

4.3 READ SECTION

1) Function

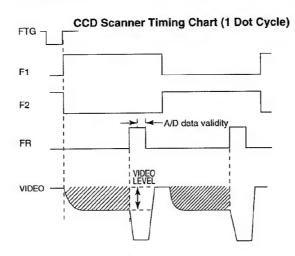
- A document is illuminated by the LED array, and the reflections pass through the reduction-projection lens and are imaged on the CCD image sensor.
- •The document image is photoelectrically transferred by the CCD image sensor, and an analog image signal corresponding to one line of the document is output continuously.
- The analog image signal enters the image signal processing circuit in ASIC (IC501) and then is converted into digital data.

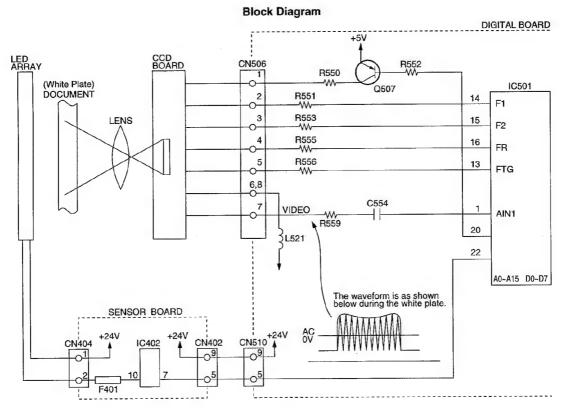
2) Circuit Operation

[Start]

When the START/COPY button is pressed, pin 48 of IC501 goes to a low level and Q507 is turned ON. This makes pin 22 of IC501 a high level and the voltage applied to the LED array turns on the LED.

F1, F2, FR and FTG signals are output to the CCD board to drive the CCD image sensor. Therefore, when the LED is turned ON, the VIDEO (analog image signal) is output from the CCD board to pin 7 of CN506.





4.4 STEPPING MOTOR DRIVE CIRCUIT

1) Function

Two individual stepping motors are used for transmission and reception. They feed the document or recording paper synchronized for reading or printing.

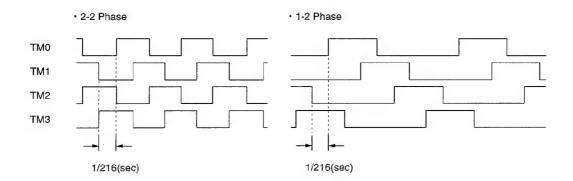
2) TX Motor

During motor driving, pin 137 of ASIC IC501 becomes a high level, driver pin 12 of IC402 becomes a low level, and Q402 turns ON. As a result, +24V is supplied to the motor coil.

Stepping pulses are output from gate array IC501 pins, 131,134~136, causing driver IC402 pins, 16~13 to drive the TX Motor Coil. The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation feeds 0.13 mm of recording paper or document paper.

The timing chart is below.

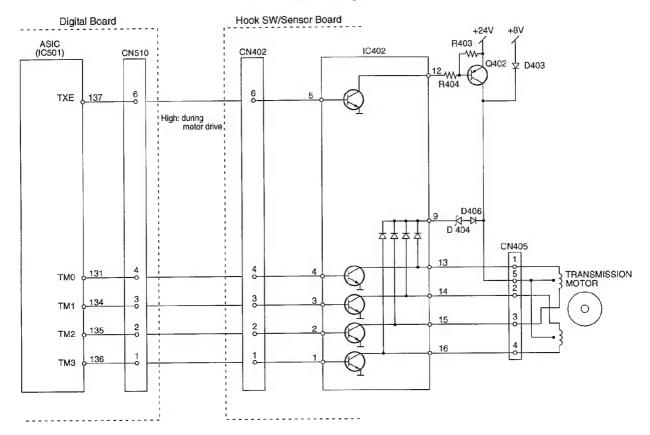
Stepping Motor Timing Chart



Stepping Motor Drive Mode

Function	Mode	Phase Pattern	Speed
Сору	Fine	1-2	216 pps
FAX	Standard	2-2	216 pps
	Fine or Half tone	1-2	216 pps
Paper Feed		2-2	216 pps
Stand-by		All phases are currently off.	None

Circuit Diagram



When the motor is stopped for a period (about 70~80 msec) during the receive mode, pin 137 of ASIC IC501 becomes a low level and driver IC402 pin 13 becomes a high level. This causes Q402 to also turn OFF, and instead of +24 V, +8 V is supplied through D403 so that the motor is held in place. When the system is in the stand-by mode, all of the motor drive transistors are OFF. Therefore the motor current is OFF.

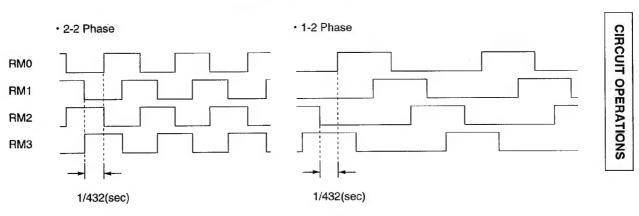
3) RX Motor

During motor driving, pin 130 of ASIC IC501 becomes a high level, driver IC401 pin 14 becomes a low level, and Q401 turns ON. As a result, +24V is supplied to the motor coil.

Stepping pulses are output from ASIC IC501 pins, 126~129, causing driver IC401 pins, 13~10 to drive the RX Motor Coil. The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation. A 1-step rotation feeds 0.13 mm of recording paper or document paper.

The timing chart is below.

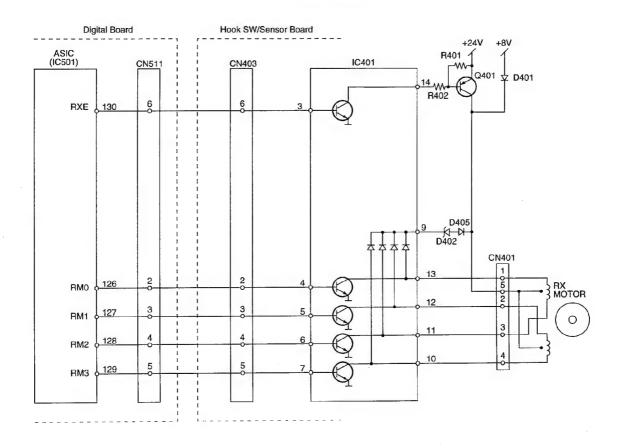
Stepping Motor Timing Chart



Stepping Motor Drive Mode

Function	Mode	Phase Pattern	Speed
Сору	Fine	1-2	432 pps
FAX	Standard	1-2	432 pps
	Fine or Half tone	1-2	432 pps
Paper Feed		1-2	432 pps
Stand-by		All phases are currently off.	None

Circuit Diagram



When the motor is stopped for a period (about 70~80 msec) during the receive mode, pin 130 of ASIC IC501 becomes a low level and driver IC401 pin 14 becomes a high level. This causes Q401 to also turn OFF, and instead of +24V, +8V is supplied through D401 so that the motor is held in place. When the system is in the stand-by mode, all of the motor drive transistors are OFF. Therefore the motor current is OFF.

CIRCUIT OPERATIONS

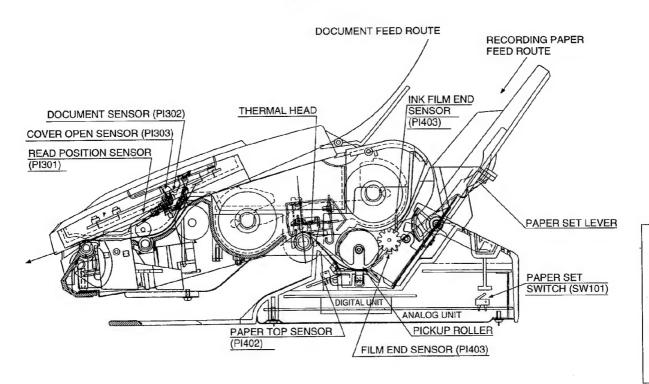
4.5 SENSORS AND SWITCHES

All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
Operation Panel	PI301	Document Read Position	[REMOVE DOCUMENT]
	Pl302	Document	[CHECK DOCUMENT]
	PI303	Cover Open	[CHECK COVER]
Digital PCB & Analog PCB &	SW401	Hook	
Sensor PCB	SW101	Paper Set	[CHECK LEVER]
	PI402	Paper Top	[PAPER JAMMED]
	PI403	Film End	[FILM EMPTY]

See the TEST FUNCTION - SENSOR CHECK SECTION for the sensor test. (#815 of Service Mode test. Refer to page 106.)

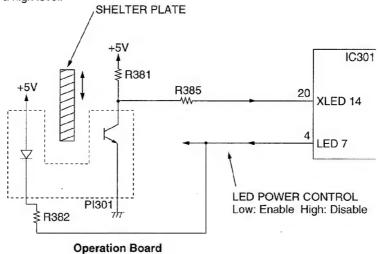
Sensor Locations



①[Read Position Sensor (PI301)]

The sensor detects the front edge of the document.

When a document is brought to the read position, the shelter plate passes over the sensor light, the phototransistor turns ON, and the input signal of IC301-20 pin (Operation) becomes a low level. When there is no document at the read position, the shelter plate closes the sensor light, the phototransistor turns OFF, and the input signal of IC301-20 pin (Operation) becomes a high level.

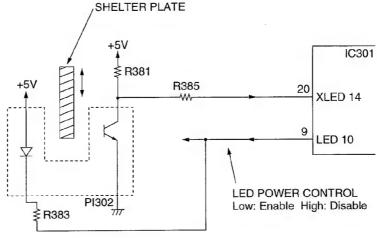


	Phototransistor	Signal (IC301-20 pin)
Non Read Position	OFF	High level
Read Position	ON	Low level

②[Document Sensor (PI302)]

The sensor detects whether or not a document is in place.

When a document is detected, the shelter plate closes the sensor light, the phototransistor turns OFF, and the input signal of IC301-20 pin (Operation) becomes a high level. When there is no document, the shelter plate passes over the sensor light, the phototransistor turns ON, and the input signal of IC301-20 pin (Operation) becomes a low level.



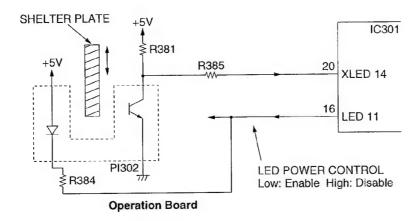
Operation Board

	Phototransistor	Signal (IC301-20 pin)
No Document	ON	Low level
Document Set	OFF	High level

③[Cover Open Sensor (Pl303)]

The sensor detects whether the front cover is open or closed.

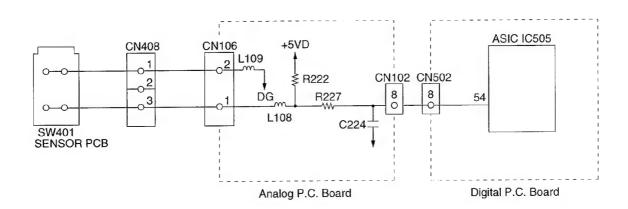
When the operation panel cover is closed, the shelter plate passes over the sensor light, the phototransistor turns ON, and the input signal of IC301-20 pin (Operation) becomes a low level. When the cover is opened, the shelter plate closes the sensor light, the phototransistor turns OFF, and the input signal of IC301-20 pin (Operation) becomes a high level.



	Phototransistor	Signal (IC301-20 pin)
Open	ON	Low level
Closed	OFF	High level

4[Hook Switch (SW401)]

When the handset is raised, the switch is turned ON, and the signal at pin 54 of IC505 is low. When the handset is returned, the switch is turned OFF, and the signal at pin 54 of IC505 is high.



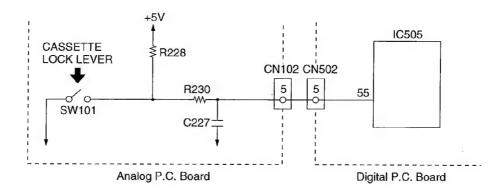
	SW	Signal (IC505-54 pin)
ON-Hook	Release	Low level
OFF-Hook	Push	High level

⑤[Paper Set Switch (SW101)]

The sensor detects whether or not the cassette lock lever is in place.

When the recording paper is installed and the CASSETTE LOCK LEVER is pulled toward you, the plate is separated from the switch lever, causing the signal at pin 55 of IC505 to be high.

When the recording paper is installed and the CASSETTE LOCK LEVER is pushed back, the plate presses down on the switch lever, causing the signal at pin 55 of IC505 to be low.

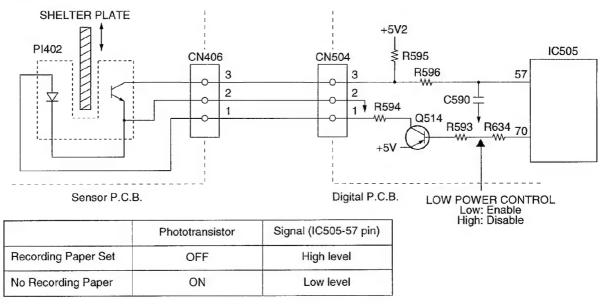


	SW101	Signal (IC505-55 pin)
Set the cassette lock lever	ON	Low level
Release the cassette lock lever	OFF	High level

⑥[Paper top Sensor (PI402)]

The sensor detects whether or not recording paper is present so that printing can start.

When the recording paper is loaded on the print head, the shelter plate shuts the sensor light, and the phototransistor turns OFF. The input signal of IC505-57 pin becomes a high level. Usually, the shelter plate passes over the sensor light, the phototransistor turns ON, and the input signal of IC505-57 pin becomes a low level.



The Interrupt Sensor PI402 LED current is controlled by the IC505-70 pin.

[Film End Sensor (Pl403)]

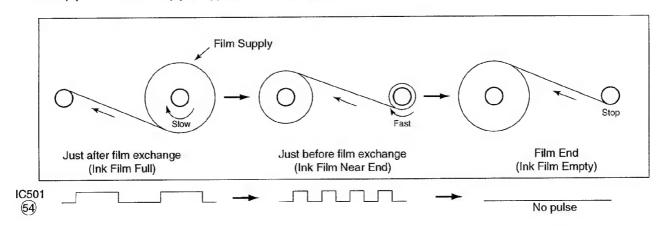
The sensor detects when the ink film has been used up.

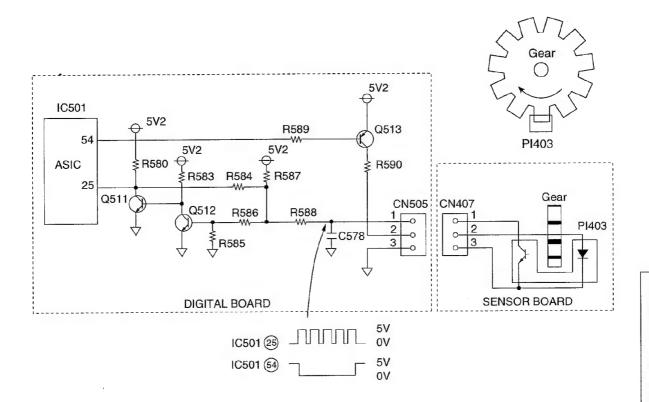
As film is used, the revolving speed of the rolled film becomes faster.

In addition, when the film is used up, it comes off of the paper roll.

The remaining film is checked by the revolving speed. After the film stops turning, the film end is checked.

The rotary encoder rotates slowly when the ink film is full (when printing), as shown in the diagram below. It rotates faster when it is near it's end. Sensor Pl403 converts the rotation of the rotary encoder into pulses and the amount of ink film remaining is then calculated internally by the ASIC (IC501) and stored into memory. Then this causes an error such as "Film empty" or "Film near empty" to appear on the LCD display.





5. MODEM SECTION

5.1 FUNCTION

The unit uses a 1 chip modem (IC505), enabling it to act as an interface between the control section for FAX sending and receiving, and the telephone line. During a sending operation, the digital image signals are modulated and sent to the telephone line. During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by CCITT. This 1 chip modem (IC505) has hardware which sends and detects all of the necessary signals for FAX communication. It can be controlled by writing commands from the CPU (IC501: inside ASIC) to the register in the modem (IC505). This modem (IC505) also sends DTMF signals, generates a call tone (from the speaker), and detects a busy tone and dial tones.

Overview of Facsimile Communication Procedures (CCITT Recommendation):

1) ON CCITT (International Telegraph and Telephone Consultative Committee)

The No. XIV Group of CCITT, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.

2) Definition of Each Group

• Group I (G1)

Official A-4 size documents without using formats which reduce the band width of a signal are sent over telephone lines. Determined in 1968.

Transmission for about 6 minutes at a scanning line density of 3.85 lines/mm.

• Group II (G2)

Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes.

Methods to suppress redundancy are not used.

Determined in 1976.

• Group II (G3)

Method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent within about one minute.

Determined in 1980.

• Group IV (G4)

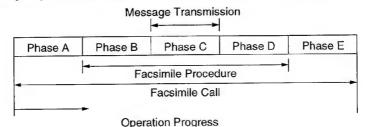
Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible.

The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

CIRCUIT OPERATIONS

3) Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A: Call setting

Call setting can be manual/automatic.

Phase B: Pre-message procedure

Phase B is a pre-processing procedure and sequence for the confirming the status of the terminal, transmission route, etc., and for terminal control. It executes terminal preparation status, determines and displays terminal constants, confirms synchronization status, prepares for transmission of facsimile messages, etc.

Phase C: Message transmission

Phase C is the procedure for the transmission of facsimile messages.

Phase D: Post message procedure

Phase D is the procedure for confirming that the message is completed and received. In the case of continuous transmission, phase B or phase C are repeated for transmission.

Phase E: Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4) Concerning Transmission Time



Transmission time consists of the following.

Control time: This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:

This is the time required for the transmission of document contents (image data). In general, this time is

recorded in the catalog, etc.

Hold time: This is the time required after the document contents have been sent to confirm that the document was actually sent, and to check for telephone reservations and/or the existence of continuous transmission.

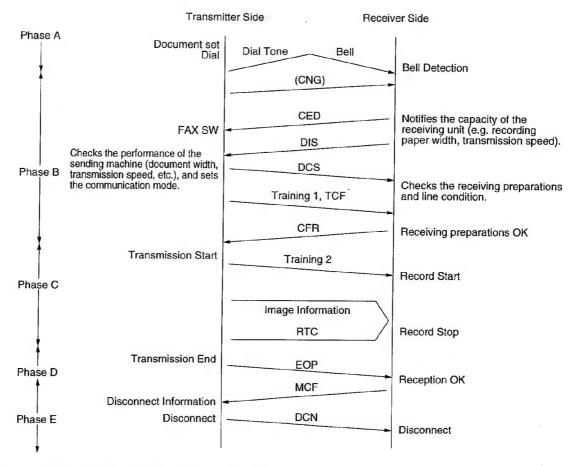
5) Facsimile Standards

	Telephone Network Facsimile
Item	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600, 12000, 14400 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension : MH Mode 2 dimension : MR Mode (K=2.4)
Resolution	Main Scan: 8 pel/mm Sub Scan: 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value: 10, 20 Can be recognized in 40ms.

6) Explanation of Technology

(1) G3 Communication Signals (T. 30 Binary Process)

For G3 Facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals.



Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1.

An example of a binary process in G3 communication is shown below.

Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal) Identification Signal Format.....00000001

Function:

Notifies the capacity of the receiving unit. The added data signals are as follows.

(Example)

Signal.....DCS (Digital Command Signal) Identification Signal Format.....X1000001

(Example)

Note: Some models do not support the following items.

Bit No.	DIS/DTC	DCS
1	Transmitter T.2 operation	
2	Receiver T.2 operation	Receiver T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter T.3 operation	
5	Receiver T.3 operation	Receiver T.3 operation
6	Reserved for future T.3 operation features	

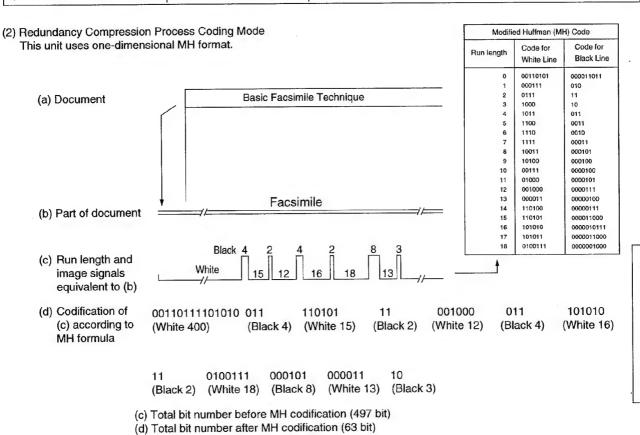
Bit No.	DIS/DTC	DCS
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter T.4 operation	
10	Receiver T.4 operation	Receiver T.4 operation
11, 12, 13, 14 0, 0, 0, 0 0, 1, 0, 0 1, 0, 0, 0 1, 1, 0, 0 0, 0, 1, 0 1, 0, 1, 0 1, 1, 1, 0 0, 0, 0, 1 1, 0, 0, 0 1, 1, 0, 1 1, 0, 0, 1 1, 0, 0, 1	Data signaling rate V.27 ter fall back mode V.27 ter V.29 V.27 ter and V.29 Not used Reserved Not used V.27 ter and V.29 and V.33 Not used Reserved Not used V.27 ter and V.29 and V.33 Not used Reserved Not used V.27 ter and V.29 and V.33 and V.17	Data signaling rate 2400 bit/s, V.27 ter 4800 bit/s, V.27 ter 9600 bit/s, V.29 7200 bit/s, V.33 12000 bit/s, V.33 Reserved Reserved 14400 bit/s, V.17 12000 bit/s, V.17 9600 bit/s, V.17
0, 0, 1, 1 0, 1, 1, 1 1, 0, 1, 1 1, 1, 1, 1	Not used Reserved Not used Reserved	Reserved Reserved Reserved
15	R8×7.7 lines/mm and/or 200×200 pels/25.4mm	R8×7.7 lines/mm and/or 200×200 pels/25.4mm
16	Two-dimensional coding capability	Two-dimensional coding capability
17, 18 (0, 0) (0, 1)	Recording width capabilities 1728 picture elements along scan line length of 215 mm ± 1% 1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% 2432 picture elements along scan line length of	Recording width 1728 picture elements along scan line length of 215 mm \pm 1% 2432 picture elements along scan line length of 303 mm \pm 1%
(1, 0)	$303~{\rm mm}\pm1\%$ $1728~{\rm picture}$ elements along scan line length of 215 mm $\pm1\%$ $2048~{\rm picture}$ elements along scan line length of 255 mm $\pm1\%$	2048 picture elements along scan line length of 255 mm \pm 1%
19, 20	Maximum recording length capability	Maximum recording length
(0, 0) (0, 1) (1, 0) (1, 1)	A4 (297 mm) Unlimited A4 (297 mm) and B4 (364 mm) Invalid	A4 (297 mm) Unlimited B4 (364 mm) Invalid
21, 22, 23	Minimum scan line time capability of the receiver	Minimum scan line time
(0, 0, 0) (0, 0, 1) (0, 1, 0) (1, 0, 0) (0, 1, 1) (1, 1, 0) (1, 0, 1) (1, 1, 1)	20 ms at 3.85 l/mm: T _{7.7} = T _{3.85} 40 ms at 3.85 l/mm: T _{7.7} = T _{3.85} 10 ms at 3.85 l/mm: T _{7.7} = T _{3.85} 5 ms at 3.85 l/mm: T _{7.7} = T _{3.85} 10 ms at 3.85 l/mm: T _{7.7} = 1/2 T _{3.85} 20 ms at 3.85 l/mm: T _{7.7} = 1/2 T _{3.85} 40 ms at 3.85 l/mm: T _{7.7} = 1/2 T _{3.85} 0 ms at 3.85 l/mm: T _{7.7} = T _{3.85}	20 ms 40 ms 10 ms 5 ms
24	Extend field	Extend field
25	2400 bit/s handshaking	2400 bit/s handshaking

Bit No.	DIS/DTC	DCS
26	Uncompressed mode	Uncompressed mode
27	Error correction mode	Error correction mode
28	Set to "0".	Frame size 0 = 256 octets 1 = 64 octets
29	Error limiting mode	Error limiting mode
30	Reserved for G4 capability on PSTN	Reserved for G4 capability on PSTN
31	T.6 coding capability	T.6 coding enabled
32	Extend field	Extend field
33 (0) (1) 34	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid Recording width capability 1216 picture elements	Recording width Recording width indicated by bits 17, 18 Recording width indicated by this field bit information Middle 1216 elements of 1728 picture elements
35	along scan line length of 151 \pm mm 1% Recording width capability 864 picture elements along scan line length of 107 \pm mm 1%	Middle 864 elements of 1728 picture elements
36	Recording width capability 1728 picture elements along scan line length of 151 \pm mm 1%	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 \pm mm 1%	Invalid
38	Reserved for future recording width capability.	
39	Reserved for future recording width capability.	
40	Extend field	Extend field
41	R8×15.4 lines/mm	R8×15.4 lines/mm
42	300×300 pels/25.4 mm	300×300 pels/25.4 mm
43	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm
44	Inch based resolution preferred	Resolution type selection "0" : neritic based resolution "1" : inch based resolution
45	Metric based resolution preferred	Don't care
46	Minimum scan line time capability for higher resolutions "0": $T_{15.4} = T_{7.7}$ "1": $T_{15.4} = 1/2T_{7.7}$	Don't care
47	Selective Polling capability	Set to "0".
48	Extend field	Extend field

Note 1 - Standard facsimile units conforming to T.2 must have the following capability: Index of cooperation (IOC)=264. Note 2 - Standard facsimile units conforming to T.3 must have the following capability: Index of cooperation (IOC)=264. Note 1 - Standard facsimile units conforming to T.4 must have the following capability: Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1		A fixed pattern is transmitted to the receiving side at a speed (2400 to 9600 bps) designated by DCS, and the receiving side optimizes the automatic equalizer, etc., according to this signal.

Signal	Identification Signal Format	Function
TCF (Training Check)		Sends 0 continuously for 1.5 seconds at the same speed as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been properly received. If TCF is not properly received, FTT (Failure To Train) X0100010 is relayed to the sender. The sender then reduces the transmission speed by one stage and initiates training once again.
Training 2		Used for reconfirming the receiving side like training 1.
Image Signal	Refer to the next page.	<u></u>
RTC (Return to Control)		Sends 12 bits (001 \times 6 times) to the receiver at the same speed as the image signal and notifies completion of transmission of the first sheet.
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If there are still more documents to be sent, they are output instead of EOP. After MCF reception, the sender transmits an image signal of the second sheet.
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it is output after RTC.
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is received.



5.2 MODEM CIRCUIT OPERATION

The modem (IC505) has all the hardware satisfying the ITU-T standards mentioned previously.

When the ASIC IC501 (53) is brought to a low level, the modern (IC505) is chip calcated and the

When the ASIC IC501 (53) is brought to a low level, the modem (IC505) is chip-selected and the resistors inside IC are selected by the select signals from ASIC (IC501) A0-A4. The commands are written through the data bus, and all the processing is controlled by the ASIC (IC501) according to ITU-T procedures. The INT signal dispatched from IRQ (pin 68 of IC505) to ASIC (IC501) when the transmission data is accepted and the received data is demodulated, the ASIC (IC501) implements post processing. This modem (IC505) has an automatic application equalizer.

With training signal 1 or 2 during G3 reception, it can automatically establish the optimum equalizer. The modem (IC505) operates using the 53.76 MHz clock (X503).

1) Facsimile Transmission

The digital image data on the data bus is modulated in the modem (IC505), and sent from pin 28, 29 via amplifier IC515 and the NCU section to the telephone line.

2) Facsimile Reception

The analog image data which is received from the telephone line passes through the NCU section and enters pin 38 of the modem (IC505). The signals that enter pin 38 of the modem (IC505) are demodulated in the board to digital image signals, then placed on the data bus.

In this case, the image signals from the telephone line are transmitted serially. Hence, they are placed on the bus in 8 bit units. Here, the internal equalizer circuit reduces the image signals to a long-distance receiving level.

This is designed to correct the observatoristics of the transmitted serially.

This is designed to correct the characteristics of the frequency band centered about 3 kHz and maintain a constant receiving sensitivity. It can be set in the service mode.

TEL LINE
$$\rightarrow$$
 T101 \rightarrow R144 \rightarrow C138 \rightarrow IC104 (2 \rightarrow 1) \rightarrow C126 \rightarrow R114 \rightarrow C105 \rightarrow IC101 (1 \rightarrow 2) \rightarrow C102 \rightarrow CN101 (7) \rightarrow {CN501 (7) \rightarrow R617 \rightarrow IC515 (2 \rightarrow 1) \rightarrow C611 \rightarrow R603 \rightarrow R629 \rightarrow IC505 (38)} { } : Digital board

3) DTMF Transmission (Monitor tone)

The DTMF signal generated in the modem (IC505) is output from pin 28, 29, and is then sent to the circuit on the same route as used for facsimile transmission.

(Line Send) {IC505 (28, 29)
$$\rightarrow$$
 C605 \rightarrow R607 \rightarrow IC515 (6 \rightarrow 7) \rightarrow CN501(8)} \rightarrow CN101 (8) \rightarrow C135 \rightarrow R150 \rightarrow IC103(48 \rightarrow 31) \rightarrow C132 \rightarrow R147 \rightarrow IC104 (6 \rightarrow 7) \rightarrow C152 \rightarrow R163 \rightarrow T101 \rightarrow TEL LINE

(DTMF Monitor Tone)

4) Call Tone Transmission

This is the call signal which is generated in the ASIC (IC501) and sent to the speaker.

{IC501 (34) → R563 → CN501 (11)} → CN101 (11) → C142 → R156 → IC103 (52 → 53) → R165 → C153
→ IC103 (54 → 56) → C106 → R116 → IC102 (4 → 5, 8) →
$$\frac{L110}{L111}$$
 → Speaker

5) Busy/Dial Tone Detection

The path is the same as FAX receiving. When it is detected, the carrier detect bit of the resistor in the modem (IC505) becomes 1, and this status is monitored by the ASIC (IC501).

MOTE	: :				
{	}:	Inside	the	digital	board

6. DESCRIPTION OF BLOCK DIAGRAM IN ANALOG SECTION

(1) Function

The analog section is composed of the following circuits.

- ① Interface circuit to connect with telephone line (NCU)
- 2 Analog gate array (IC103)
 - (1) To change the circuit configuration for Tx/Rx signals of speaker phone, Tx/Rx signals of handset, and fax signals.
 - (2) Adjust volume of speaker.
 - (3) Control other circuits such as NCU.
 - (4) Read information sent from sensors and NCU.

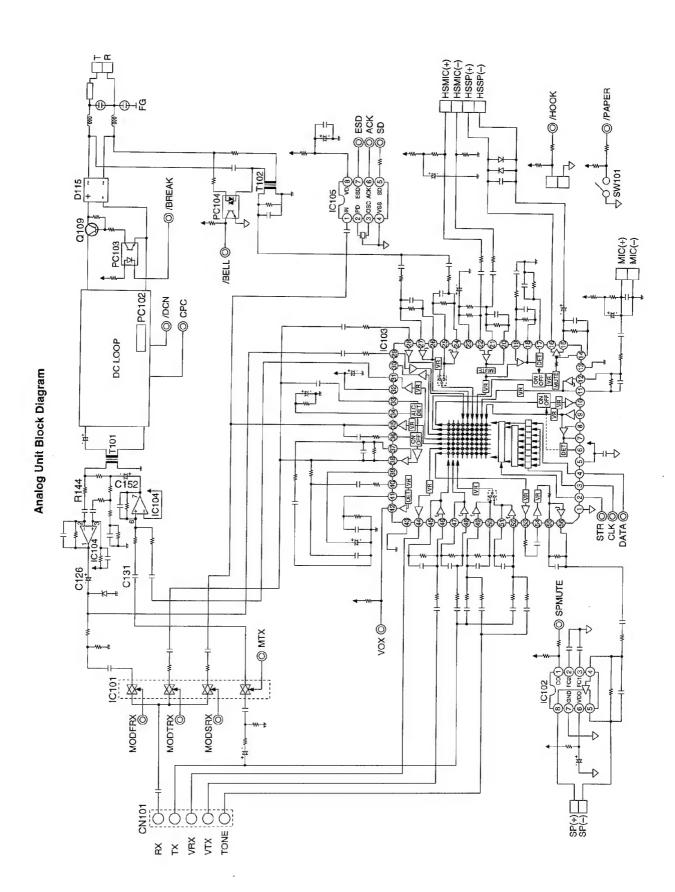
Following is the detailed description of each circuit.

[NCU]:Network Control Unit

The NCU comprises of the following; DC loop forming circuit to connect with the telephone line; Switching circuit for other interconnected telephones; Bell detection circuit; Pulse dial generation circuit; Extension line phone off-hook detection circuit; Sidetone circuit; Remote fax activation circuit. Refer to page 171 for the details.

[Analog gate array (IC103)]

The cross-point switch installed in this IC makes it possible to change the circuit configuration for any analog signals such as the fax signals sent from the digital MODEM board or the Tx/Rx signals for speaker phone. In addition, this analog gate array integrates a handset circuit, signal level adjusting circuit, ALC (Auto level controller) circuit, electronic volume, input/output ports, etc. This IC is controlled by ASIC (IC501) on the digital board.



7. NCU SECTION

7.1 GENERAL

This section is the interface with the telephone line, and this composed of renmote FAX activation circuit, bell detection circuit, pulse dial circuit, CPC detection circuit, line amplifier and sidetone circuit and multiplexer.

7.2 REMOTE FAX ACTIVATION CIRCUIT

1) Circuit Operation

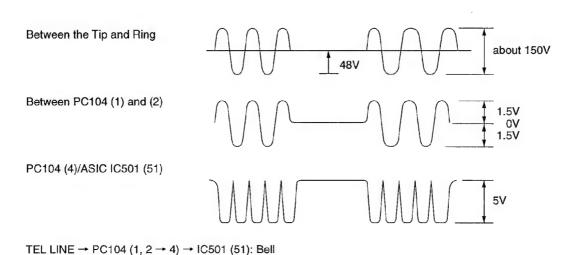
After detecting the bell signal, another telephone connected to same line activate the set to FAX mode by using DTMF signal.

TEL LINE → T102 → C207 → R209 → IC103 (27 → 35) → C204 → IC105 (1)

7.3 BELL DETECTION CIRCUIT

1) Circuit Operation

The signal waveform for each section is indicated below. The signal (low level section) input to pin 51 of ASIC IC501 on the digital board is read.



7.4 PULSE DIAL CIRCUIT AND ON/OFF HOOK CIRCUIT

1) Circuit Operation

While OFF-HOOK, Q109 is ON. The photocoupler PC103 pin (2) is a low level by IC501 pin (42) and PC103 (3) and (4) are shorted.

During a pulse dial operation, PC103 pin (2) becomes a high level by IC501 pin (42), so that PC103 pin (3) and (4) are opened. The line turns OFF. ON/OFF, controlled by IC501 pin (42), makes the pulse dial operation possible.

IC501 (42) Break High Level → CN102 (1) → Q109 OFF → PC103 (2) High level → PC103 (3)(4) OFF: DC Loop OFF (ON HOOK Status)

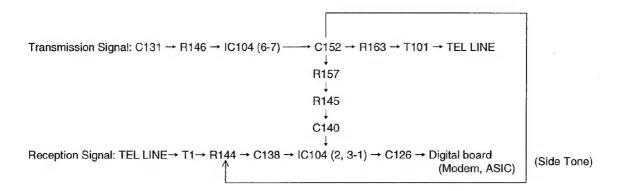
IC501 (42) Break Low Level → CN102 (1) → Q109 ON → PC103 (2) Low level → PC103 (3)(4) ON: DC Loop ON (OFF HOOK Status)

7.5 LINE AMPLIFIER AND SIDE TONE CIRCUITS

1) Circuit Operation

The reception signal received as output from line transformer T101 is given as input to R144, C138 and IC104 pin (2). Then it is input to the reception system at an amplifier gain of 5.9 dB from pin 1.

The transmission signal given as input to IC104 pin (6) via C131, and R146 is amplified to about 13 dB. It is output from pin 7 of IC104 and is transmitted to T101 via C152, R163. Without a side tone circuit, the transmission signal would return to the reception amplifier via C152 and R163. Here, the signal output from IC104 pin (7) passes through C152, R157, R145 and C140 and enters the amplifier IC104 pin (3). This is used to cancel the return portion of the transmission signal. This is the side tone circuit.



7.6 AUTO DISCONNECT CIRCUIT

1) Function

This circuit is used to detect the fact that another telephone connected to the same line is OFF-Hook.

2) Circuit Operation

During this interval C197 charges and the base of Q107 becomes high, and PC102 pin (2) becomes low, causing PC102 to go ON.

If a parallel-connected telephone or external telephone is put into an OFF-HOOK status, charge ceases to flow C192 and the base of Q107 becomes low, causing PC102 to go OFF.

When a line is connected, Q107 and PC102 go ON, causing pin 21 of IC501 (ASIC) of Digital board to go low. When the line is disconnected, Q107 and PC102 go off, causing pin 21 of IC501 (ASIC) of Digital board to go high.

7.7 CPC (Calling Party Control) DETECTION CIRCUIT

1) Function

This circuit detects the signal (cuts the current) output from the converter when the other party finishes ICM recording and goes ON-hook.

TAD detect this signal and disconnects the line. When TAD is operating, pin 4 of PC101 becomes low level. While detecting the CPC signal, pin 4 of PC101 becomes high level. This is detected, the TAD operation is stopped and the line is disconnected.

8. ITS (Integrated telephone System) and MONITOR SECTION

8.1 GENERAL

The general ITS operation is executed by the special IC103. This IC has handset circuit in 1 chip. The alarm tone, the key tone, and the beep are outputted from the ASIC IC501 (digital board). At the time of pulse dial operation, the monitor tone is outputted from the ASIC IC501.

8.2 SPEAKER PHONE CIRCUIT

1) Function

The circuit controls the automatic switching of the transmitted and received signals, to and from the telephone line, when the unit is used in the hands-free mode.

2) Circuit Operation

The speakerphone can only provide duplex.

3) Signal path

Refer to page 78.

8.3 HANDSET CIRCUIT

1) Function

This circuit is for conversation of Handset; transmission and reception of the voice via Handset.

2) Signal path

Refer to page 78.

8.4 MONITOR CIRCUIT FOR EACH SIGNALS

1) Function

This circuit is for monitoring of various tone, such as ① DTMF tone, ② Alarm/Beep/Key tone/Bell ③Dummy ring back tone.

2) Signal path

Refer to pages 78 and 79.

9. ATAS (Automatic Telephone Answering System) SECTION

1) Function

The ATAS main operation is executed by the special IC505 (MODEM) and IC514 (CODEC), IC513 (FLASH MEMORY) control signals are input from ASIC IC103.

- ① Greeting/Message Recording
- ② ICM Recording
- ③ Greeting/Message/ICM play to speaker
- 4 Greeting/Message/ICM play to Tel Line
- ⑤ Vox Detection

2) Signal Path

Refer to pages 78 and 79.

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8.1 GENERAL

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The speakerphone can only provide duplex.

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Refer to page 78.

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- 4 Greeting/Message/ICM play to Tel Line
- ⑤ Vox Detection

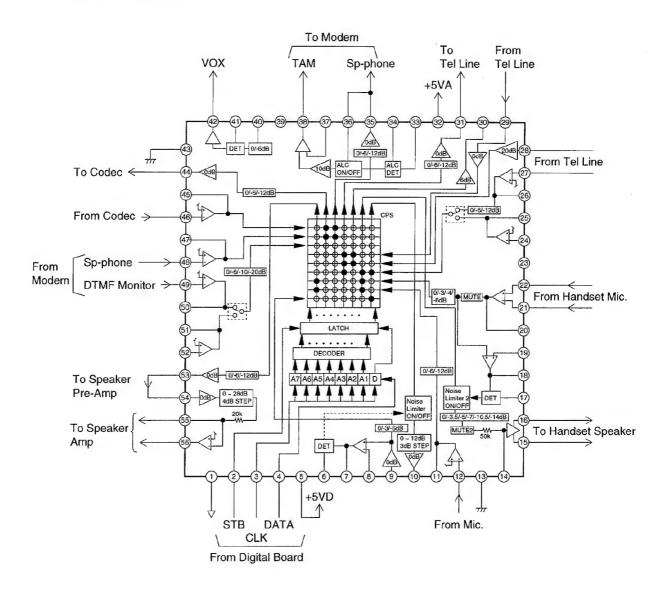
2) Signal Path

Refer to pages 78 and 79.

10. ANALOG GATE ARRAY (IC103 on the Analog Board)

This IC can perform signal route switching and level adjustments for various types of analog signals. This IC incorporates a cross-point switch (CPS), electronic volume, auto level controller (ALC) circuit for recording, attenuation circuit. The C.P.S. of this IC is controlled by sending data from digital board.

10.1 Internal Connections

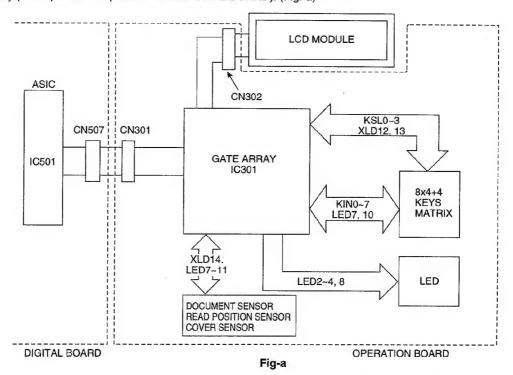


10.2 EXPLANATION OF ANALOG GATE ARRAY (IC103 on the Analog Board)

No.	Name	Function	No.	Name	Function
1	D-GND	Digital ground	29	LINEIN	Line amp input
2	STR	Strobe input	30	DHOUT	Not used
3	CLOCK	Clock input	31	LINEOUT	Line amp output
4	DATA	Data input	32	VCC	Analog power supply
5	VDD	Logic power supply	33	ALCIN	ALC input
6	NL1DET	Not used	34	ALCDET	ALC output
7	NL1OUT	Not used	35	PROUT2	Preamp output2
8	NL1IN	Not used	36	RECIN	Record input
9	CLIN	Not used	37	RECPRIN	Record preamp input
10	CLOUT	Not used	38	RECPROUT	Record preamp output
11	MICOUT	Mic amp output	39	VREF2	Internal reference voltage output
12	MICIN	Mic amp input	40	VOXIN	VOX input
13	GND	Analog ground	41	VOXDET	VOX detection adjustment
14	RIN	HS receiver amp input	42	VOXOUT	VOX output
15	ROUT1	HS receiver amp output1	43	GND2	Analog ground
16	ROUT2	HS receiver amp output2	44	LSRXOUT	SP phone TX amp output from mic
17	NL2DET	HS TX detection adjustment	45	LSTXOUT	SP phone RX amp output from codec
18	NL2OUT	HS TX detection amp input	46	LSTXIN	SP phone RX amp inverting input from codec
19	NL2IN	HS TX detection amp output	47	PLYOUT	SP phone TX amp output from modem
20	HSMICOUT	HS mic amp output	48	PLYIN	SP phone TX amp inverting input from modem
21	MSMIC-	HS mic amp —input	49	TONE1IN	Tone 1 amp inout
22	HSMIC+	HS mic amp ∸input	50	TONE1OUT	Tone 1 amp output
23	VREF1	Analog internal reference voltage	51	TONE2OUT	Tone 2 amp output
24	CIDIN	Caller ID amp input	52	TONE2!N	Tone 2 amp input
25	CIDOUT	Caller ID amp output	53	PROUT1	Preamp output1
26	EXTOUT	EXT amp output	54	SPPRIN	Speaker preamp input
27	EXTIN	EXT amp input	55	SPIN	Speaker amp input
28	DHIN	Monitor input	56	SPOUT	Speaker amp output

11. OPERATION BOARD SECTION

The unit consists of a LCD (Liquid crystal display), KEYs and LEDs (light-emitting diodes). They are controlled by the Gate Array (IC301) and ASIC (IC501: on the DIGITAL BOARD). (Fig.-a)



Key Matrix

	KIN0	KIN1	KIN2	KIN3	KIN4	KIN5	KIN6	KIN7	
KSL0	SW301 ONE1, 5	SW305 ONE4, 9	SW309 STOP	SW313 REDIAL/PAUSE	SW317 *	SW321 0	SW325 #	SW329 AUTO ANSWER	
KSL1	SW302 2, 7	SW306 ONE5, 10	SW310 START/COPY/SET	SW314 SP-PHONE	SW318 7	SW322 8	SW326 9	SW330 V	
KSL2	SW303 ONE3, 8	SW307 LOWER	SW311 MENU	SW315 MUTE	SW319 1	SW323 2	SW327 3	SW331	
KSL3	SW304 RESOLUTION	SW308 DIRECTORY PROGRAM	SW312 HELP	SW316 FLASH	SW320 4	SW324 5	SW328 6	SW332 FILM REMAINING	

	LED7	LED10	
XLD12	SW336 IQ-FAX	SW335 CALLER ID SEARCH	Ref. No of operation Board
XLD13	SW334 PLAY MESSAGES	SW333 ERASE	

SENSOR

	LED7	LED10	LED11
XLD14	PC301 DOCUMENT TOP SENSOR	PC302 DOCUMENT SET=1	PC303 COVER OPEN=1

LED

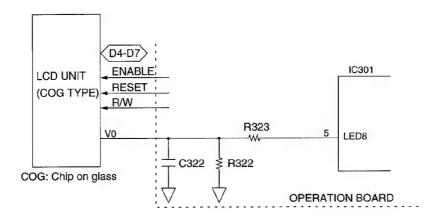
	LED2	LED3	LED4	LED8
ſ	LED301	LED302	LED303	LCD CONT
l	SP-PHONE	TAD/FAX	PLAY MESSAGES	0=D 1=N

12. LCD SECTION

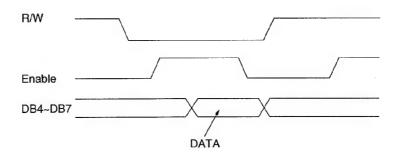
The Gate Array (IC301) only needs to write the ASCII code from the data bus (D4~D7). V0 is supplied for the crystal drive. R323 and R322 are density control resistors.

Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC301).

Circuit Diagram



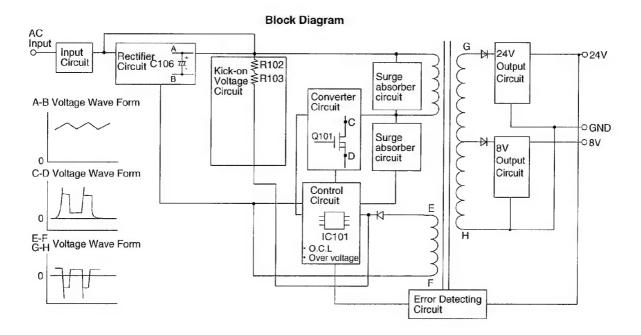
Timing Chart



Density	Norma	Dark
LED8 (IC301-5pin)	Н	L

13. POWER SUPPLY BOARD SECTION

This power supply board uses the switching regulator method. The block diagram is as follows.



[Input Circuit]

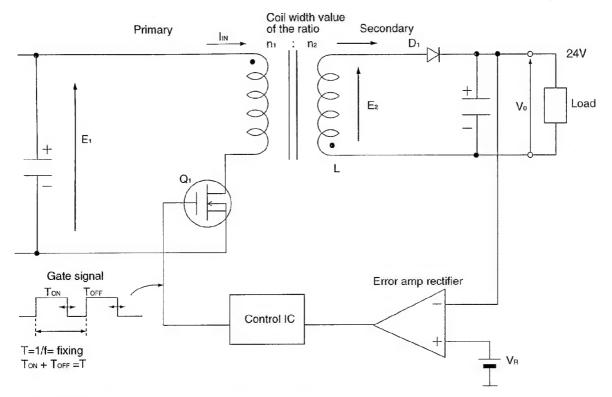
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]

The input current is rectified by D101,D102,D103 and D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]

Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.



Next, we will explain how the Power supply unit is controlled. The control method of this power supply unit is pulse width modulation.

When Q_1 is ON, the energy is charged in the transfer primary coil according to E_1 . When Q_1 is OFF, the energy is output from the secondary transfer as follows.

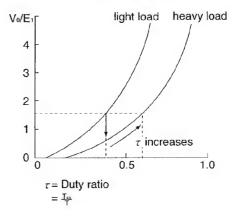
$$L \rightarrow D_1 \rightarrow Load \rightarrow L$$

Then the power is supplied to the Load. When Q_1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how T_{ON} is controlled, stabilization occurs. Also, when

the current load becomes too large, in order to decrease the voltage output, the increase in τ is controlled and the output voltage is stabilized.

Therefore, basically the timing: Ton/Toff of Q1 controls the output voltage.

Output/Input voltage value of ratio



[Surge Absorber Circuit]

This circuit is for absorbing surge voltage generated by the transformer.

[Control Circuit and Detecting Circuit]

The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.

In this power supply, the duty ratio is defined by changing the ON period of the main transistor.

This is shown as follows.

When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.

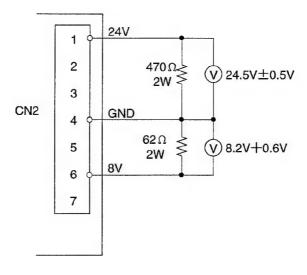
[Over Current Limiter (O.C.L)]

The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is limited by this circuit.

[Over Voltage Circuit]

If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.

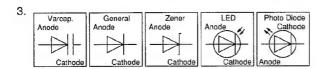
Dummy load method (to quickly check the power supply output)



FOR THE SCHEMATIC DIAGRAMS

Note:

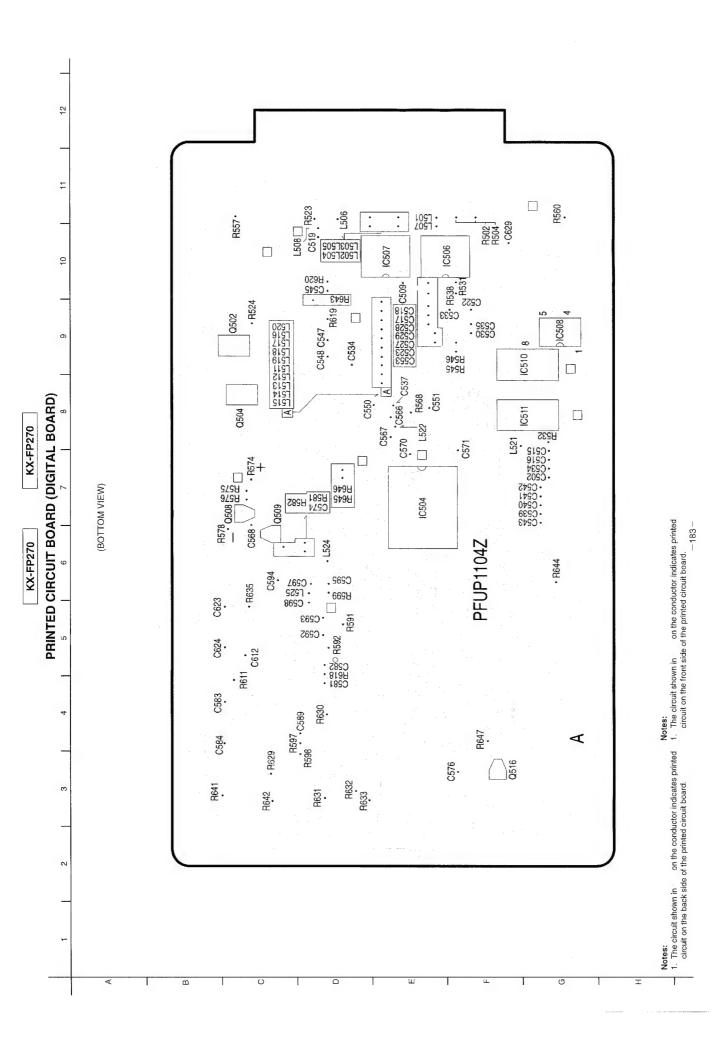
- 1. DC voltage measurements are taken with an oscilloscope or a tester with a ground .
- The schematic diagrams and circuit board may be modified at any time with the development of new technology.

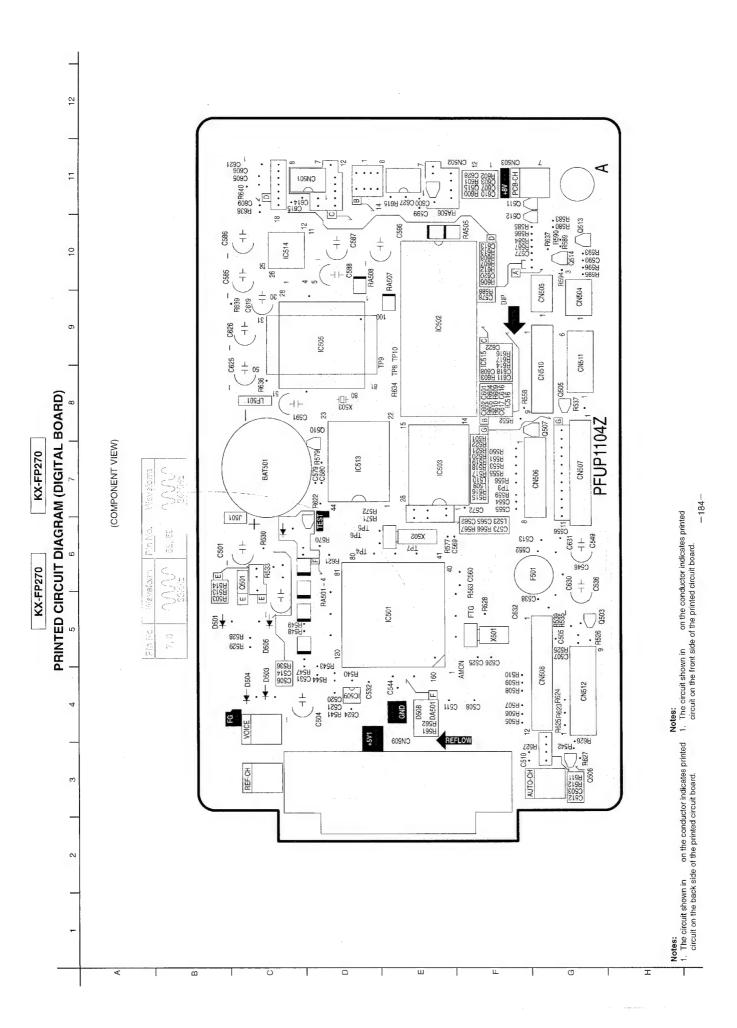


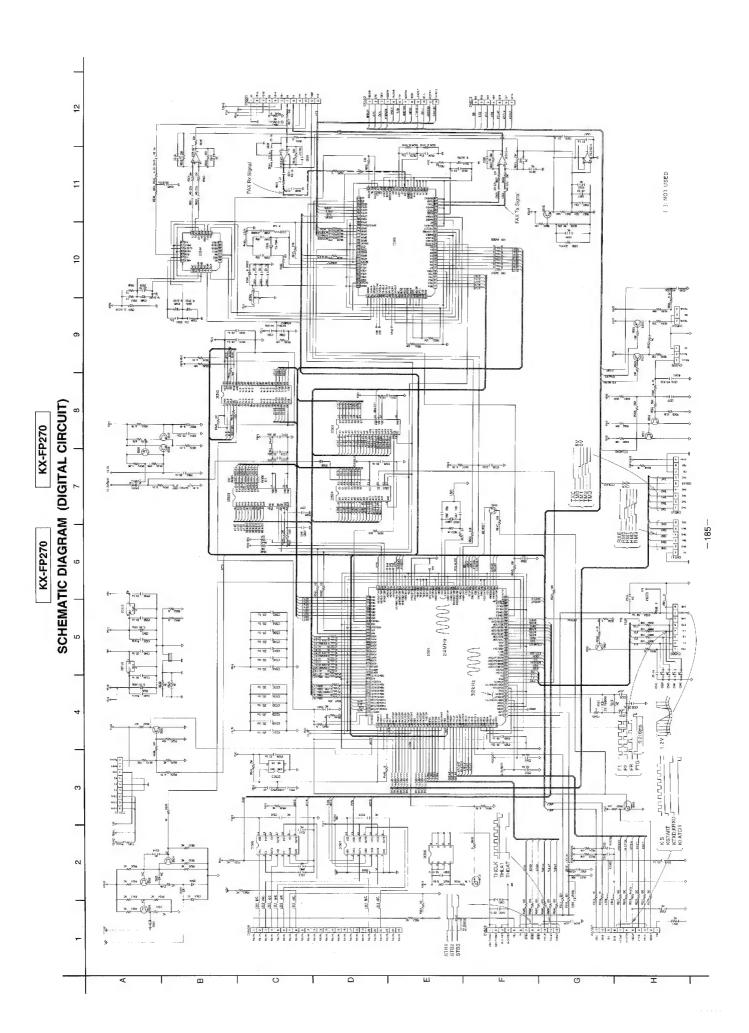
Important safety notice

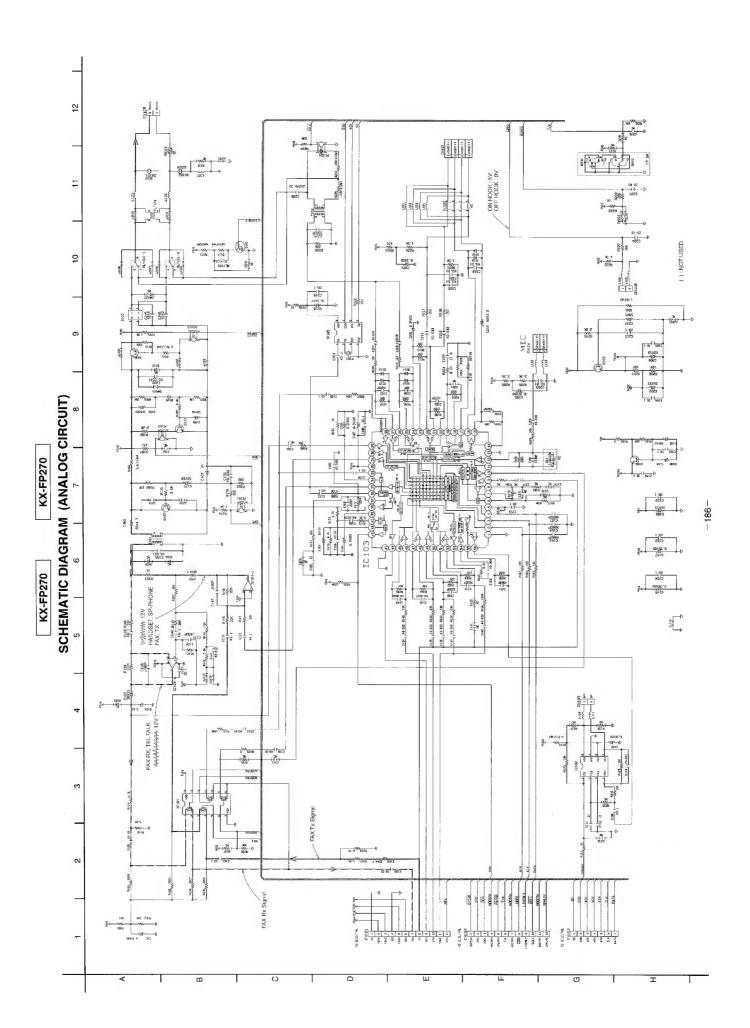
Components identified by $\,\underline{\mathbb{A}}\,$ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

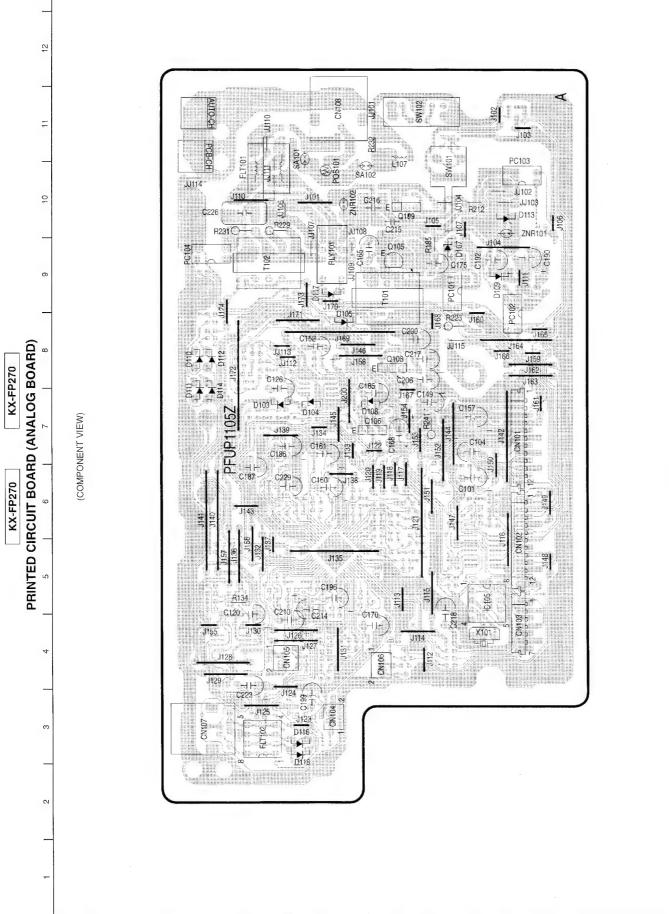
MEMO







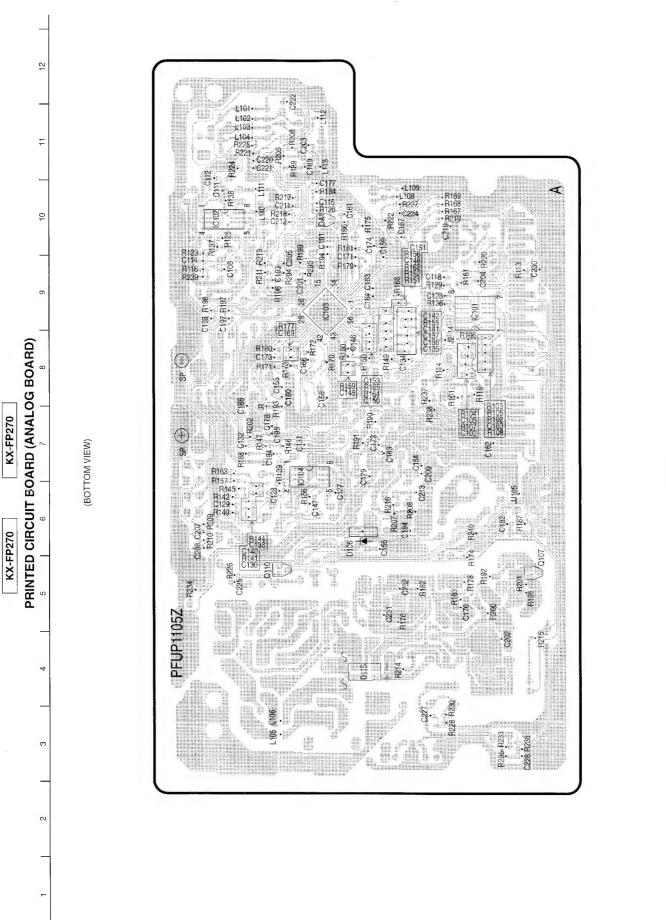




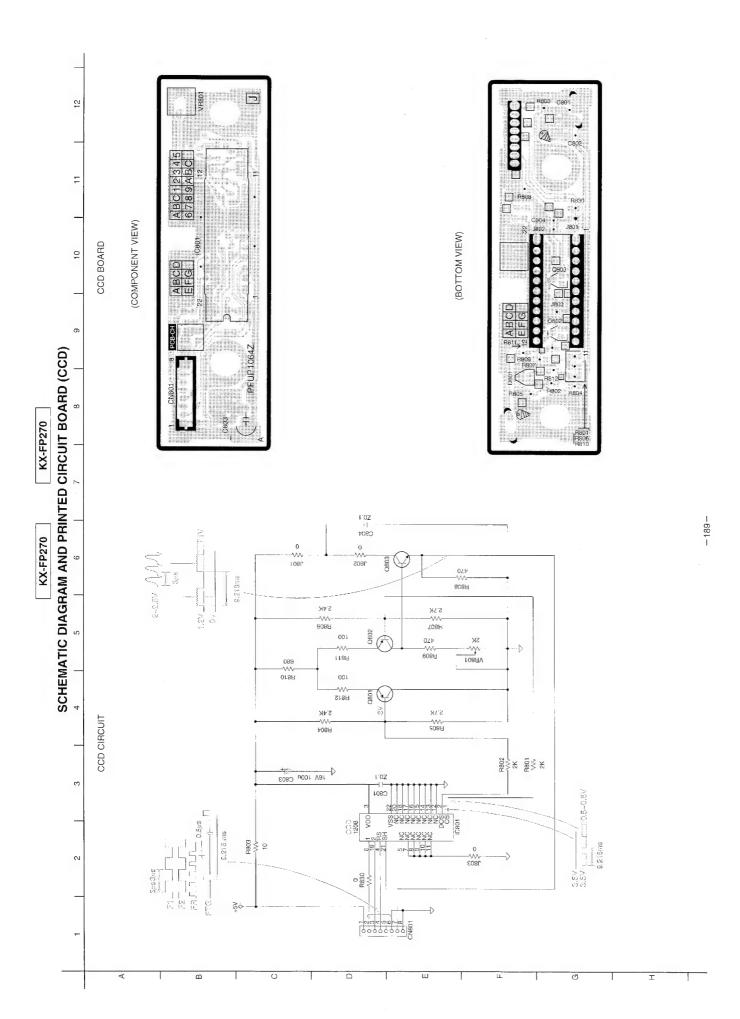
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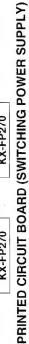
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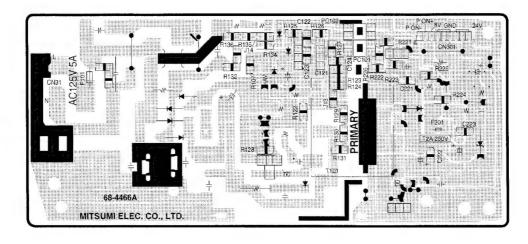
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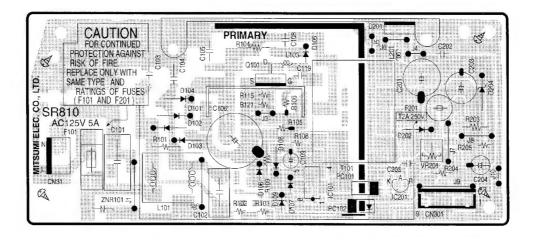
9

(BOTTOM VIEW)

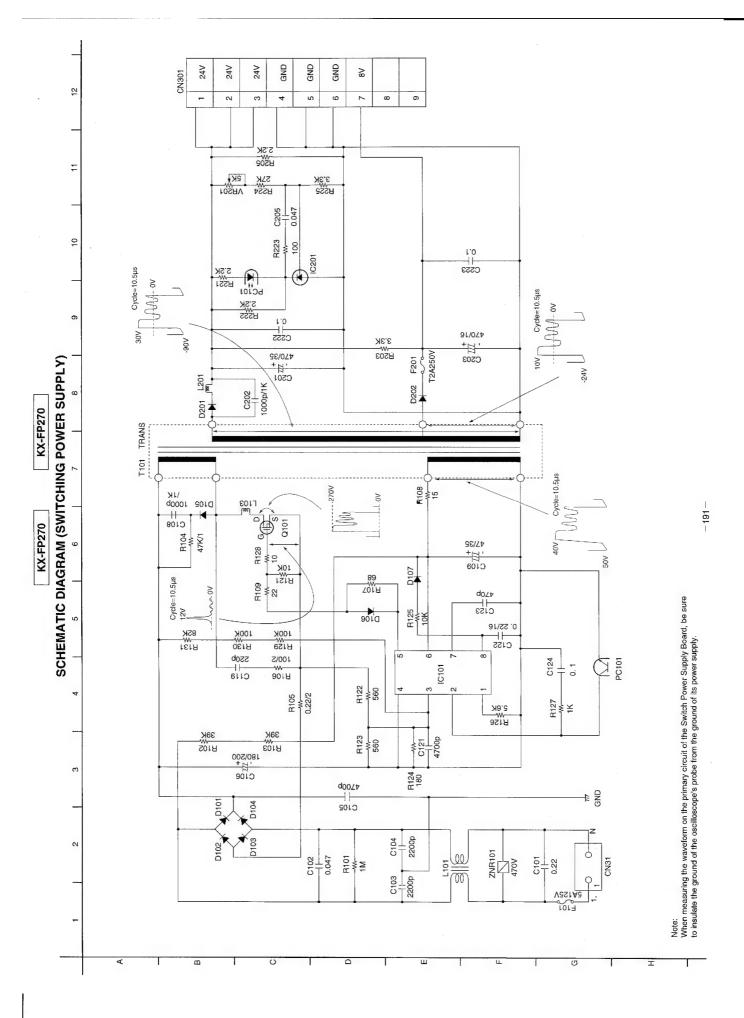
KX-FP270 KX-FP270

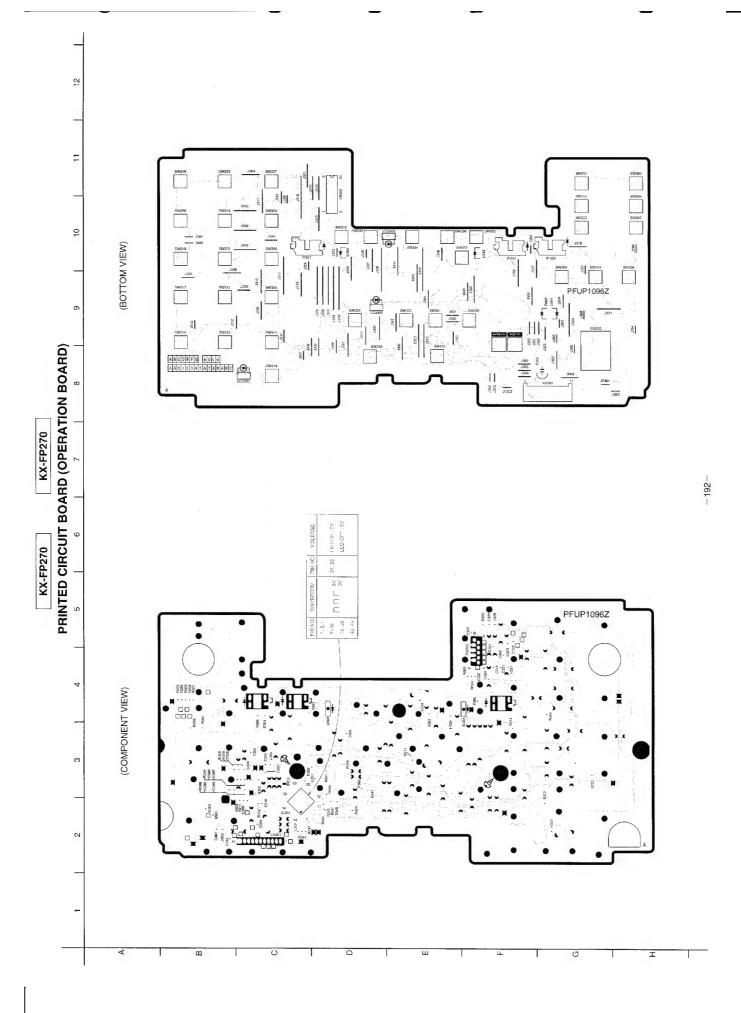
(COMPONENT VIEW)

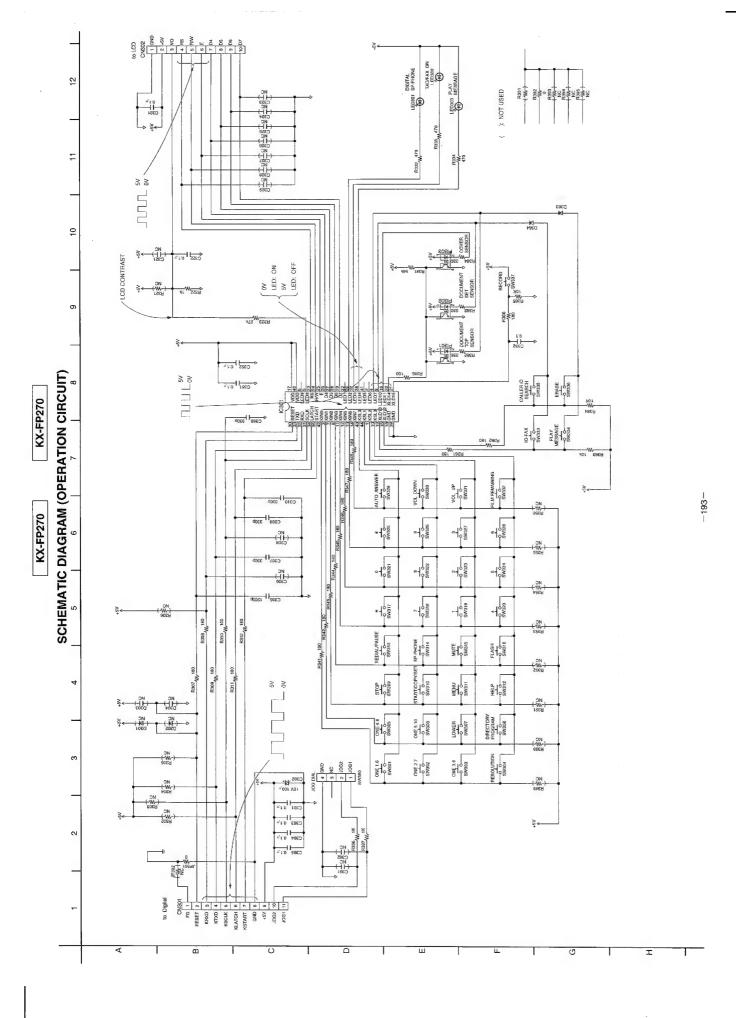


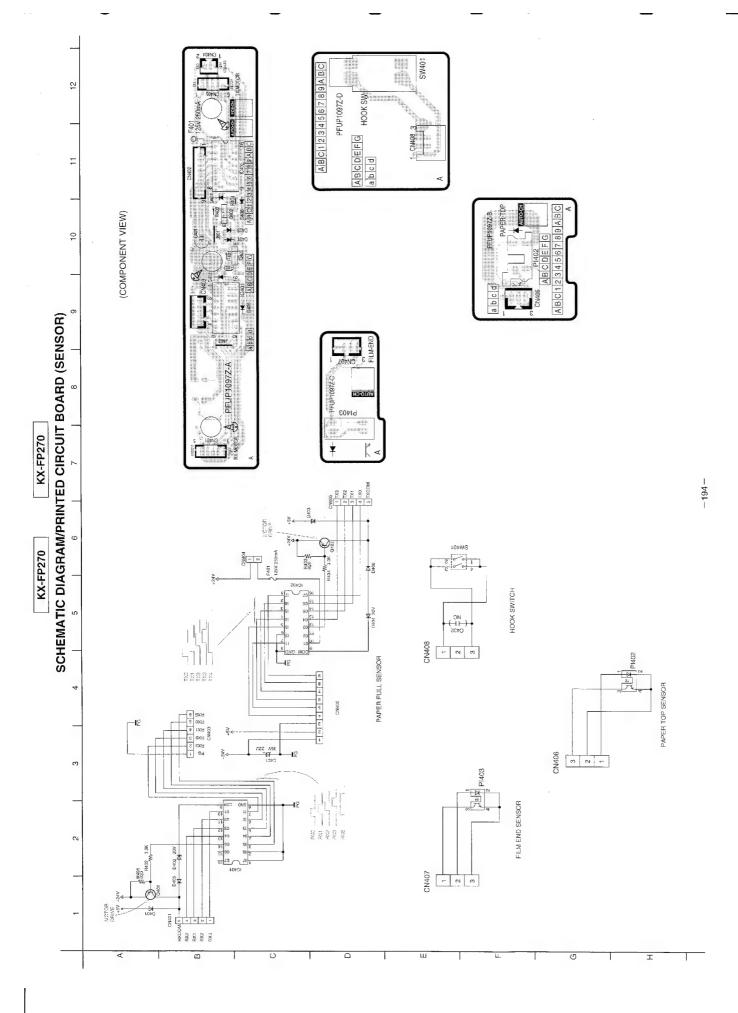


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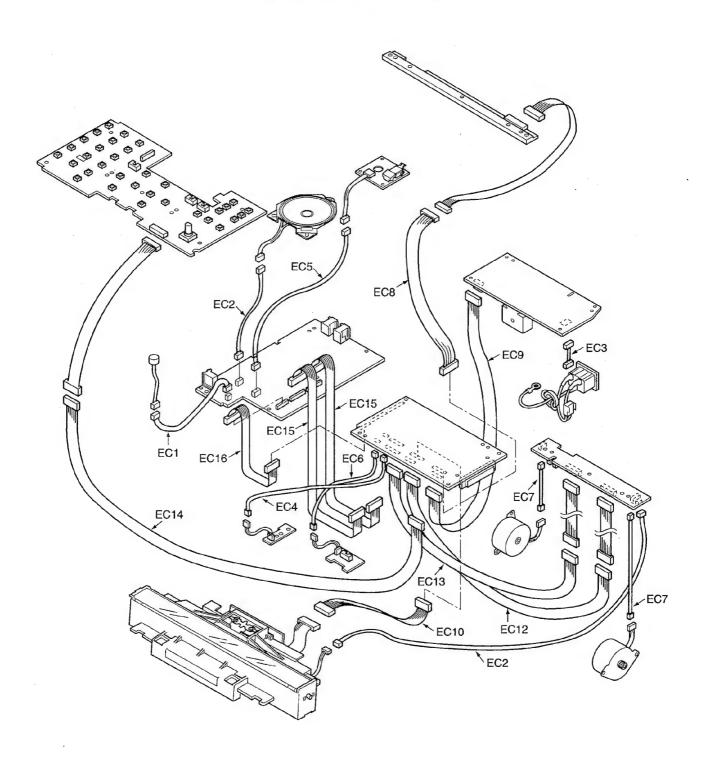




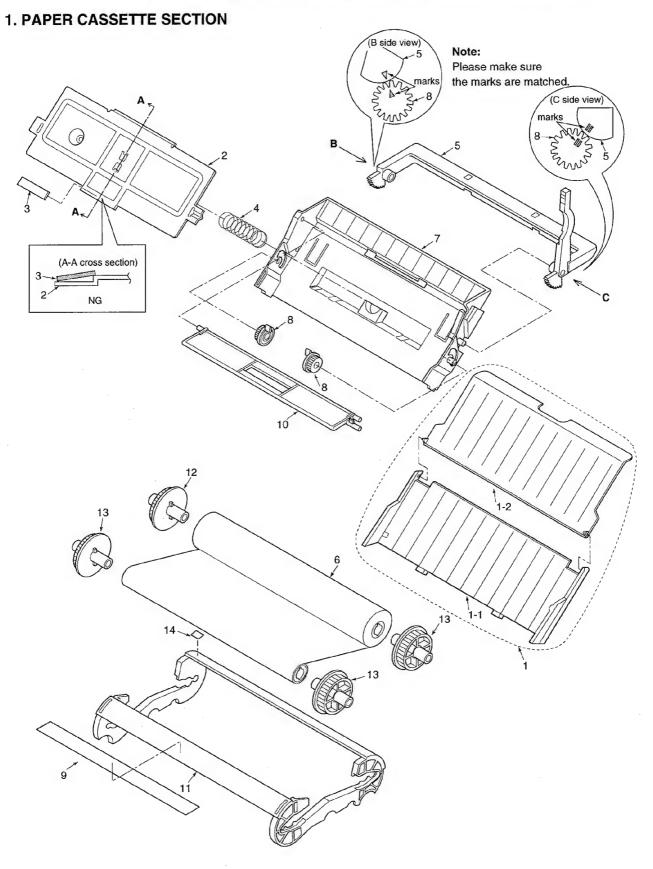
TERMINAL GUIDE OF THE IC'S TRANSISTORS AND DIODES

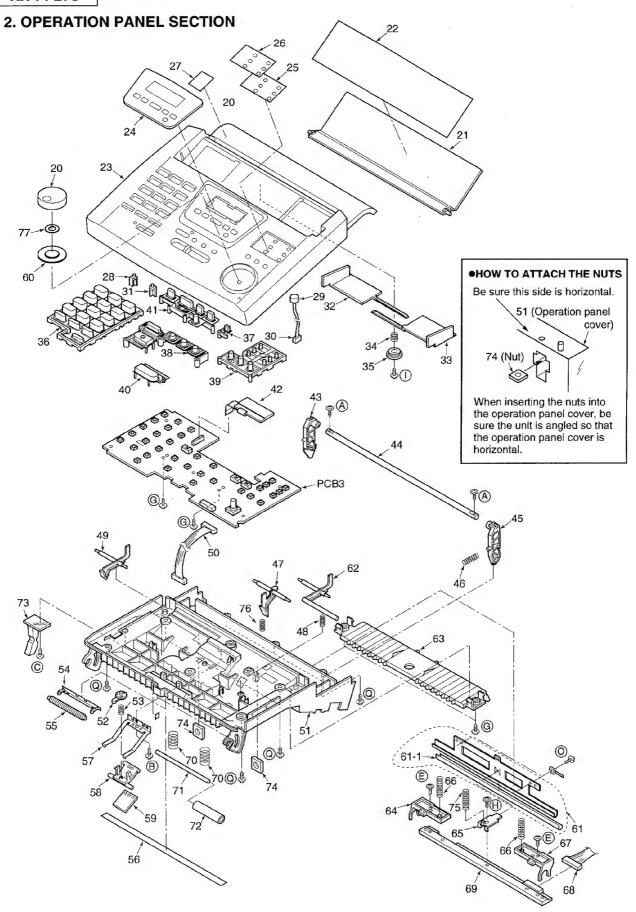
		T	I	
4 3 2 1 PENISSON 42AN	28	80 31 81 30 BEVIDEG 7555	16 1 POWIDATORS	120 121 121 160 1 40
PFVIS80842AN	PFVIM4480CF	PFVIR667555	PQVIBA12003	PFVIM66395M1
15	17 16 PFWIFP270M	PQVINJM2113M PQVINJM4558M PFVINJM4558M	23 33 34 44 1 MN53007QAF	PQVITC4066BF
24 25 32 1	17 16 24 25 32 1	1 3	55	44 35 32 23 44 11 11 11 11 11 11 11 11 11 11 11 11 1
PFVIR10485	AN6382NFA	PFVIMC78M05C	PFVIFA5317P	PFVIKM29N04T
PQVTDTC143E PQVTDTC114EU 2SB1197K, 2SB1218A,	E B C	Cathode	E _{CB}	E _C B
2SD1819A, 2SB709A	2SB1322, 2SD1921Q	MA141WK	2SA1627	2SC2235
GS _D	Anode	Anode Cathode	123	BCE
PQVTFS10KM10	PQVDERA1802 PFVDAG01A	PFVDSF5LC20U	AN1431T	2SD2136
Cathode	Cathode	Anode Cathode PFVDD1N4005	Cathode	Cathode Anode
1SS119	PQVDHZS2B1, MA4056	MA4220, PFVDD1NL20U MA7200, 1SS147	PQVDR325CA47	RLS71
PQVDS1ZB40F1				

FIXTURES AND TOOLS

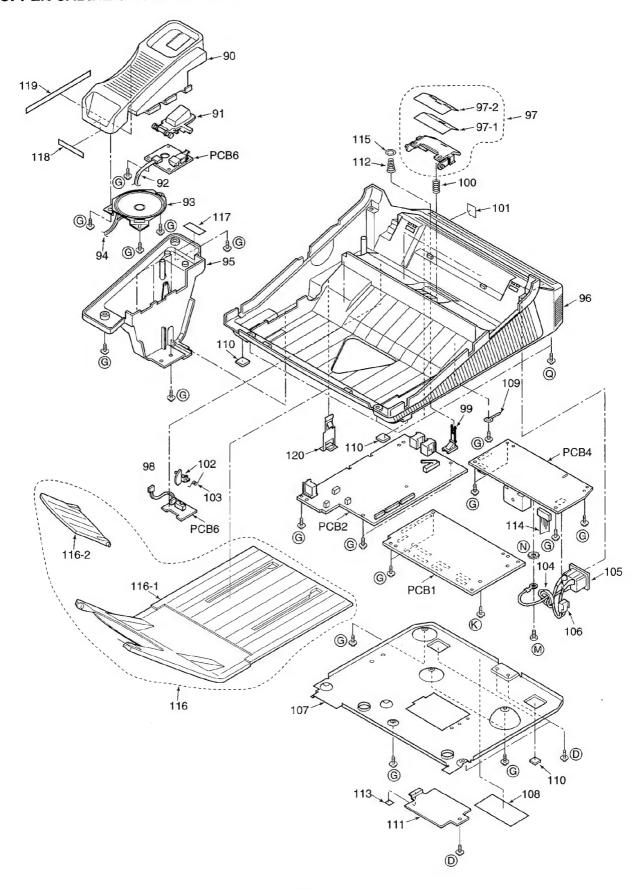


CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

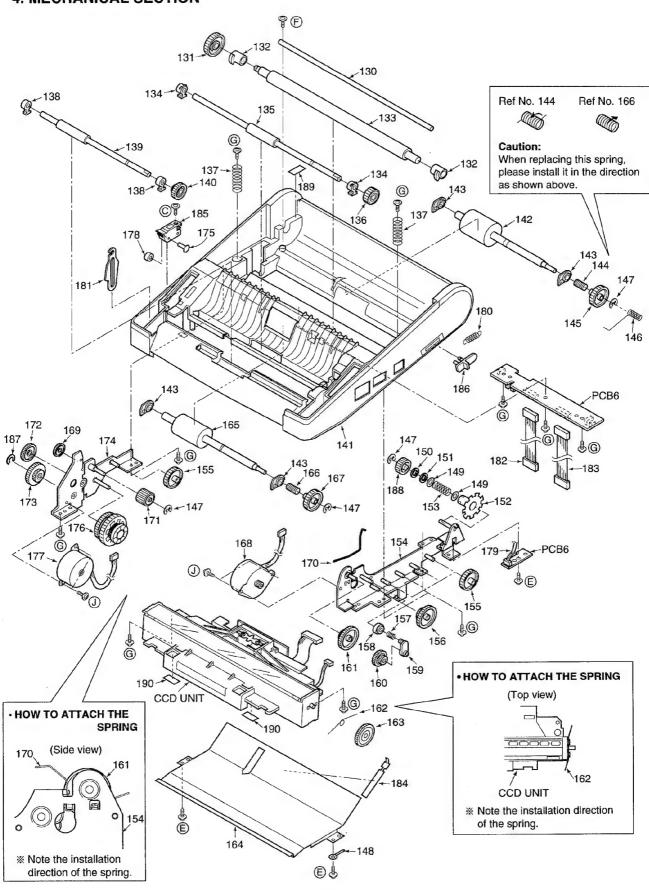




3. UPPER CABINET/P.C.B. SECTION



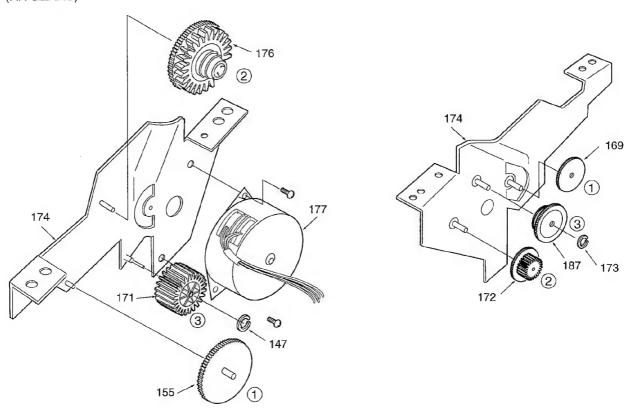
4. MECHANICAL SECTION



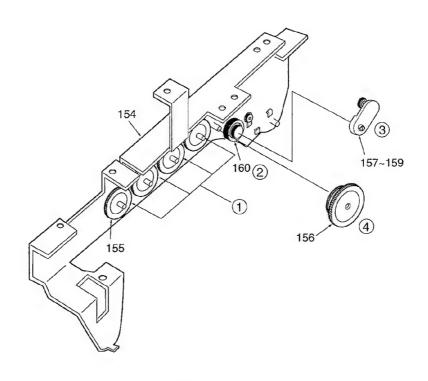
•HOW TO ATTACH THE GEARS

Attach the gears in the order as shown below.

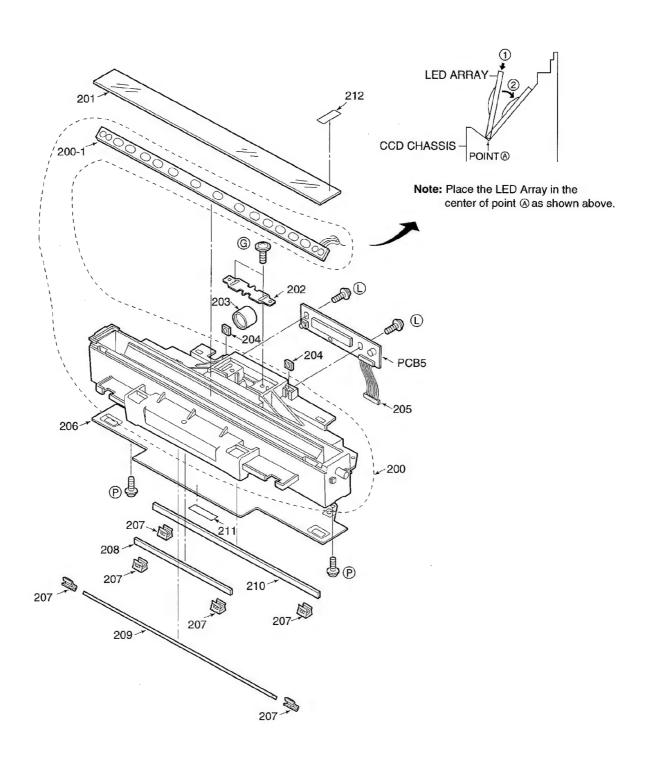
(RX GEARS)



(TX GEARS)



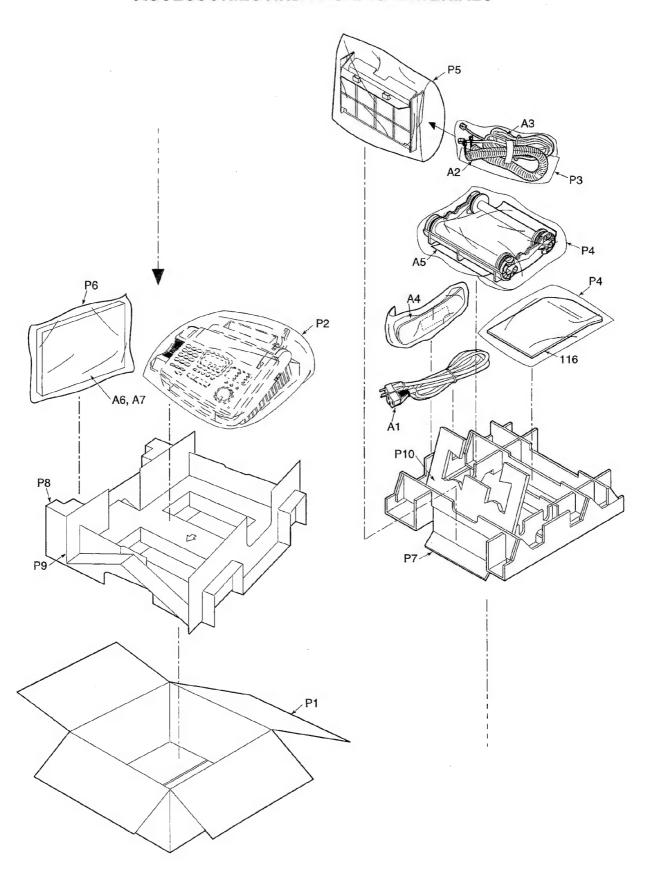
5. CCD UNIT SECTION



6. ACTUAL SIZE OF SCREWS AND WASHER

Ref. No.	Part No.	Figure	Ref. No.	Part No.	Figure
A	XYN3+F8	A	①	XTW3+W6P	(mm
B	XTW3+S6PR	(Jum	(J)	XTW3+6L	
©	XTW3+S8PFZ	(mm	(K)	XTW3+U6L	<u>Jun</u>
0	XTW3+U6LFZ		(L)	XYN3+F10	
(E)	XTW3+U6L	(Jim	M	XSB4+6	
Ē	XTW3+W8P	d-m-	(3)	XWC4B	
©	XTW3+S10P	(©.	XYN3+F12	(Jumm
Θ	XTW3+5LR	(Jum	(P)	XTB3+10G	Диши
			0	XTW3+S12P	(Jumm

ACCESSORIES AND PACKING MATERIALS



REPLACEMENT PARTS LIST

This replacement parts list is for KX-FP270 only. Refer to the simplified manual (cover) for other areas. Pcs Ref. No Part No. Part Name & Description Model KX-FP270 PFQT1451Z INDICATION LABEL 22 OPERATION PANEL GRILLE 23 PEGG1025X1 1 Notes: 1. The marking (RTL) indicates that the Retention Time is limited for this item. PFGP1102Z LCD PANEL 24 25 PFGD1035Z TEL. NO. CARD 1 After the discontinuation of this assembly in production, the item will TRANSPARENT PLATE continue to be available for a specific period of time. The retention period 26 PFGV1004Z 1 of availability is dependent on the type of assembly, and in accordance 27 PQQT11004Z INDICATION LABEL 1 PFGP1091Z LED COVER 28 with the laws governing part and product retention. After the end of this MICROPHONE 29 POJM128Z 1 period, the assembly will no longer be available. . Important safety notice. 30 PFJS02Q09Z CONNECTOR, 2 PIN Components identified by A mark have special characteristics 31 PFGP1090Z LED COVER 1 important for safety. 32 PFKR1010Z2 DOCUMENT GUIDE-L 1 When replacing any of these components, use only manufacturer's 33 PFKR1011Z2 DOCUMENT GUIDE-R 1 specified parts. 3. The S mark indicates service standard parts and may differ from 34 PFUS1034Z SPRING 1 35 PFDG1002Z GEAR 1 production parts. 4. RESISTORS & CAPACITORS 36 PFBX1041Z1 BUTTON, DIAL 37 PFBC1021Z1 BUTTON, HELP Unless otherwise specified. 1 All resistors are in ohms (Ω) k=1000 Ω , M=1000k Ω 38 PFBX1040Y1 BUTTON, STOP 1 BUTTON, ONE TOUCH 39 PFBX1043Z1 All capacitors are in MICRO FARADS(μF) P= $\mu \mu F$ *Type &Wattage of Resistor 40 PFBC1020Z1 BUTTON, START Type EBX:Metal Film PQRD:Carbon 41 PFBX1044Z1 BUTTON, FAX SAVE FRC:Solid LIQUID CRYSTAL DISPLAY PEAVJS10401 S ERD:Carbon ERG:Metal Oxide PORO:Fuse 42 1 PQ4R:Chip FRO:Metal Film EBF:Wire Wound 43 PFDE1037Z LEVER, LOCK-L 1 44 PFDF1016Z SHAFT, LOCK Wattage LEVER, LOCK-R 45 PEDE10677 1 46 PFUS1080Z SPRING, LOCK LEVER 1 ECFD:Semi-Conductor ECCD, ECKD, PQCBC, PQVP: Ceramic 47 PFDE1069Z LEVER, DOCUMENT DETECTION SPRING DOCUMENT LEVER PEUS10277 ECQM, ECQV, ECQE, ECQU, ECQB: Polyester 48 1 ECQS:Styrol PQCBX,ECUV:Chip ECEA,ECSZ,ECOS : Electrolytic 49 PFDE1020Z LEVER, READ DETECTION 1 ECQP: Polypropylene ECMS:Mica CONNECTOR, 11 PIN 50 PEJS11006Z Voltage 51 PFUV1014Y COVER, OPERATION PANEL ECQ Type ECQG ECSZ Type 1 ECQV Type 52 PFHR1019Z LEVER, SEP. SPRING ADJUST 1 PEUS11217 SPRING, DOCUMENT FEED 1H: 50V OF:3.15V CJ :6.3V 1V :35V 53 1 05: 50V 2A:100V 1A:10V 1A :10V 50.1H:50V 54 PFUS1026Y SPRING, SUPPORT ROLLER 1 1:100V 55 PQDR10005Y BOLLEB :16V :63V 1V:35V 1C 1,1 1 2E:250V 2:200V COVER, READING SHEET 2H:500V QJ:6.3V 1E,25:25V 2A :100V 56 PFHX1081Z 1 57 PFUS1082Z SPRING, DOCUMENT FEED 1 58 PFHR1081Z GUIDE, SEPARATION RUBBER 1 PFHG1020Z RUBBER PARTS, SEPARATION Ref. No. Part No. Part Name & Description Pcs 59 1 CABINET AND ELECTRICAL PARTS 60 PFHX1199Z COVER, JOG SHEET PFZU2FP200M RIBBON GUIDE ASS'Y 61 1 PAPER TRAY ASS'Y 61-1 PFHX1115Z PLASTIC, RIBBON GUIDE 1 PFYEFP200M 62 PFDE1043Y LEVER, OPEN SENSOR PEYE2FP200M SUB PAPER TRAY ASS'Y 1 1 1-1 PEKE1009Z1 CABINET, OPE, SUB COVER PFKS1013Z1 TRAY 1 63 S 1 1-2 PFMD1026Z COVER, PAPER CASSETTE 1 64 PFDE1034Y GUIDE, HEAD HOLDER 1 2 65 PFMH1038Z ANGLE, HEAD FULCRUM RUBBER PARTS, CASSETTE SEP. 1 1 3 PFHG10327 SPRING, THERMAL HEAD 2 SPRING, CASSETTE TRAY 1 66 PEUS10837 4 PFUS1087Z 67 PFDE1035Y GUIDE, HEAD HOLDER 5 PFDE1041Z3 LEVER, CASSETTE LOCK S 1 68 PFJS12Q03Z CONNECTOR, 12 PIN INK FILM (20m) 1 6 PEPE1031Z PFJHS013Z THERMAL HEAD PAPER CASSETTE S 1 69 S 1 PFKS1011X1 2 8 PFDG1034Z GEAR, GEAR INDICATION LABEL 1 9 PFQT1258Y PEUS10257 SPRING ROLLER 2 1 70 10 PFKK1004Z AHUTTER 71 PEDF1005Z SHAFT, SUPORT ROLLER PFHR1043Z1 RIBBON CASSETTE S 1 11 72 PQDR9685Y ROLLER, SUPPORT 1 12 PFDG1038Z1 GEAR 1 PEHR1047Y ARM, DUMPER GEAR 3 73 1 13 PFDG1037Z 74 PFHE1004Z NUT, STEEL 2 PFQT1221Z INDICATION LABEL 14 75 PFUS1088Z SPRING, THERMAL HEAD 1 SPRING, DOCUMENT LEVER 76 PFUS11097 1 PFHX1212Z JOG DIAL SHEET (2.OPERATION PANEL SECTION) 1 PFBE1002Z4 BUTTON, JOG DIAL 1 20 PFKS1018Z1 DOCUMENT TRAY 1

ef. No.	Part No.	Part Name & Description	Pcs	Ref. No.	Part No.	Part Name & Description	F
		(3. UPPER CABINET/P.C.B. SECTION	N)	152	PFDG1036Z	GEAR, ENCORDER	T
				153	PFUS1065Z	SPRING, BACK TENSION	1
	PFKM1014Y1	CABINET COVER, H/S CRADLE S	1	154	PFUA1009Y	CHASSIS, TX GEAR	
	PFBH1004Y1	BUTTON, HOOK S	1	155	PFDG1032Y	GEAR, IDLER	
	PFJS03Q05Z	CONNECTOR, 3 PIN	1	156	PFDG1033Y	GEAR, IDLER	
	PQAS5P13Y	SPEAKER	1	157	PFUS1019Z	SPRING, THRUST	
	PFJS02R54Z	CONNECTOR, 2 PIN	1	158	PFDG1005Z	GEAR, CHANGEOVER	
;	PFKM1015Z1	CABINET BASE, H/S CRADLE S	1	159	PFDE1014Z	ARM, CHANGEOVER	
	PFKF1024W1	CABINET. BASE S	1	1.00	I DETOTIE	ann, or antagover	
		P. SEPARATION HOLDER ASS'Y	1	160	DED C10007	CEAR IN ER	
	PFZEFP250M				PFDG1009Z	GEAR, IDLER	
-1	PFHG1045Z	RUBBER, PAPER SEPARATION	1	161	PFDG1008Z	GEAR, IDLER	
-2	PFHX1114Z	SEPARATION SHEET	1	162	PFUS1017Y	SPRING, STATIC ELECTRIC	l
	PFJS03R52Z	CONNECTOR, 3 PIN	1	163	PFDG1007Z	GEAR, IDLER	l
	PFDE1042Z	LEVER, PAPER LOCK SENSOR	1	164	PFMD1016Y	COVER, MAIN S	
				165	PFDN1004Z	ROLLER, SEPARATION	
0	PFUS1068Z	SPRING, P. SEPARATION	1	166	PQUS10055Z	SPRING, ONE WAY	ı
1	Not Used			167	PFDG1012Z	GEAR, SEPARATION ROLLER	ı
2	PQDE10055Z	LEVER, PAPER TOP SENSOR	1	168	PFJQ1011Z	TX MOTOR	ı
3	PFUS1076Z	SPRING, PAPER TOP	1	169	PFDG1031Y	GEAR, IDLER	ı
4	PQLB1E1	FERRITE CORE S	1	1	1.154,5511	- 11 1, 16 mm 1	ı
5	1		1	170	DELICADADA	SERVING STATIO EL FOTEIO	ı
	PQJP03S07Z	'		170	PFUS1018X	SPRING, STATIC ELECTRIC	
6	PQJS02Q59Y	CONNECTOR, 2 PIN	1	171	PFDG1039Y	GEAR, RIBBON DRIVE S	1
7	PFMD1017Y	COVER, BASE	1	172	PFDG1076Z	GEAR, IDLER	ı
8	PFGT1352Z	NAME PLATE,AL	1	173	PFDG1075Z	GEAR, IDLER	ı
9	PQHM112Z	CLAMPER	1	174	PFUA1013Z	CHASSIS, RX GEAR	ı
				175	PFDF1019Y	SHAFT, PARALELL PIN	ı
0	PFHA1001Z	RUBBER PARTS, LEG S	4	176	PFDX1008Z	GEAR, WIND TORQUE LIMITER	ı
1	PQHM171Z	DOOR-LID, ROM COVER	1	177	PFJQ1010Z	RX MOTOR	1
2	PFUS1086Z	SPRING, PAPER SEPARATION	1	178	PFDR1008Z	ROLLER, DUMPER	ı
	PFHX1142Z	RIBBON GUIDE SHAFT SHEET	1	179	PFJS03R57Z		ı
3				1/9	FFJ503H5/Z	CONNECTOR, 3 PIN	ı
4	PFJS09Q04Z	CONNECTOR, 9 PIN	1			1	ı
5	PFNW1002Z	WASHER	1	180	PFUS1071Z	SPRING, OPEN BUTTON	ı
6	PFZE1FP250M	DOCUMENT TRAY ASS'Y	1	181	PFHR1048Z	ARM, STOPPER	ı
6-1	PFKS1020Z1 .	DOCUMENT TRAY	1	182	PFJS06Q01Z	CONNECTOR, 6 PIN	ı
6-2	PFKS1021Z1	SUB DOCUMENT TRAY	1	183	PFJS09R56Z	CONNECTOR, 9 PIN	ı
7	PFHX1171Z	VIBRATION SHEET	4	184	PFHX1139Z	COVER, ROLLING SHEET	ı
8	PFHX1148Z	VIBRATION SHEET	1	185	PFHR1044Z	GUIDE, DUMPER HOLDER	ı
9	PFHX1170Z	VIBRATION SHEET	1	186	PFYTFP200M	OPEN BUTTON ASS'Y	ı
0	PFUS1081X,	SPRING, RX EARTH	1	187	PQFN51Z	WASHER	ı
o	11 00 100 17,	SI TIING, TIX EXITTI	•	188	PFDG1029Y	GEAR, RIBBON DRIVE S	ı
		(4. MECHANICAL SECTION)		189	PFQT1221Z	INDICATION LABEL	
)	PFDF1018Z	SHAFT, RIBON GUIDE	1	190	PFHX1171Z	COVER, VIBRATION SHEET	
1	PFDG1027Y	GEAR, PLATEN DRIVE	1		1		ĺ
2	PFDJ1011Z	SPACER, PLATEN	2				ĺ
						1	ĺ
3	PFDN1010Z	ROLLER, PLATEN	1				l
4	PFDJ1007Z	SPACER, ROLLER	2				İ
5	PFDN1006Z	ROLLER, DOCUMENT FEED	1				1
6	PFDG1004Z	GEAR, DOCUNENT FEED	1				ļ
7	PFUS1073Z	SPRING, POP UP	2			(5. CCD UNIT SECTION)	l
8	PFDJ1006Z	SPACER, ROLLER	2	200	PFWLF780M	CHASSIS ASS'Y	l
9	PFDN1005Z	ROLLER, DOCUMENT FEED	1	200-1	PFVDSLA30222	LED ARRAY	ĺ
-	1			201	PF0G1001Z	TARGET GLASS	1
0	PEDG10037	GEAR DOCUMENT SEED BOLLED	1	202	PFUS1021Z	SPRING	ı
	PFDG1003Z	GEAR, DOCUMENT FEED ROLLER					
1	PFKM1033Z1	CABINET, MAIN S	1	203	PF0L1001Z	LENS	
2	PFDN1011Z	ROLLER, PICK UP	1	204	PFHE1004Z	NUT	
3	PQDJ10002Z	SPACER, ROLLER	4	205	PFJS08R58Z	CONNECTOR, 8P	
4	PFUS1067Z	SPRING, CLUTCH	1	206	PFMD1007Z	COVER	
5	PFDG1074Z	GEAR, PICK UP ROLLER	1	207	PFUS1028Z	SPRING	
6	PFUS1122Z	SPRING, EARTH	1	208	PF0M1003Z	MIRROR, SMALL	
		1	4	209	PF0M1003Z	MIRROR, LARGE	l
7	XUC2FY	RETAINING RING					
3	PQHM112Z	CLAMPER	1	210	PF0M1002Z	MIRROR, MIDDLE	l
9	PFNW1003Z	WASHER	2	211	PFHX1141Z	SHEET	
				212	PFHX1215Z	SHEET	İ
0	PFHG1030Z	RUBBER PARTS	1				l
	XWE5VW	WASHER	1		I .	1	l

This rep	olacement part	s list is for KX-FP270 or	nly.	Refer to	the simplified ma	nual (cover) for other areas.	
Ref. No.	Part No.	Part Name & Description	Pcs	Ref. No.	Part No.	Part Name & Description	Pcs
	ACCESSORIES	AND PACKING MATERIALS		Q516	2SD1819A	TRANSISTOR(SI) S [OR 2SC4155 OR 2SC4081]	1
A1	PQJA200Z	POWER CORD A	1			[0.1.200 / 1.1.00 / 1.	
A2	PQJA212M	HANDSET CORD	1	IC508	PFVTSI4431DY	TRANSISTOR(SI)	1
A3	PQJA59V	TELEPHONE CORD AS	1				
A4	PFJXE0105Z	HANDSET ASS'Y	1				
A 5	PFQW1246Z	LEAFLET	1				
A6	PFQX1197Z	INSTRUCTION BOOK	1		1	(DIODES)	
A7	PFQV1036Z	ADVANTAGE PROGRAM SHEET	1	D508 DA501	RLS71 MA141WK	DIODE(SI) DIODE(SI)	1
P1	PFPK1366Z	GIFT BOX	1				
P2	PFPH1008Z	PACKING SHEET	1	1	1		
P3	XZB20X20A04	BAG,POLYETHYLENE	1			(BATTERY)	
P4	XZB21X43A04	BAG,POLYETHYLENE	2	BAT501	PQPCR2032H09	BATTERY S	1
P5	XZB20X35A04	BAG, POLYETHYLENE	1				ì
P6	XZB32X45A04	BAG, POLYETHYLENE	1			1	l
P7	PFPN1116Z	CUSHION, UPPER S	1	ł			
P8	PFPN1114Z	CUSHION S		ŀ		(CONNECTORS)	
P9	PFPN1115Z	CUSHION S	1	CN501	PQJP12A19Z	CONNECTOR, 12 PIN	1
P10	PFPE1041Z	CUSHION, STOPPER S	1	CN502	PQJP12A19Z	CONNECTOR, 12 PIN	1
				CN503	PQJP07A19Z	CONNECTOR, 7 PIN	1
				CN504	PQJP03G100Z	CONNECTOR, 3 PIN	1
			1 1	CN505	PQJP3G30Y	CONNECTOR, 3 PIN	1 1
	DIGIT	AL BOARD PARTS		CN506	PQJP8G30Y	CONNECTOR, 8 PIN	1
	2.0			CN507	PQJP11G30Y	CONNECTOR, 11 PIN	1
PCB1	PFWP1FP270M	DIGITAL BOARD ASS'Y (RTL)	1	CN508	PQJP12G30Y	CONNECTOR, 12 PIN	1
4				CN510	PQJP9G30Y	CONNECTOR, 9 PIN	1
		(ICs)		CN511	PQJP06G100	CONNECTOR, 6 PIN	1
IC501	PFVIM66395M1	ic	1 1	CN512	PQJP09G100Z	CONNECTOR, 9 PIN	1
IC502	PFWIFP270M	IC (ROM)	1				
IC503	PFVIM4480CF	IC	1				
IC504	PFVIGM6256FF	IC	1				
IC505	PFVIR667555	IC	1			(COILS)	
IC509	PFVIS80842AN	IC	1	L509~520	PQLQR1RM601	COIL	12
IC510	PFVIMC78M05C	IC	1	L522	PQLQR1ET	COIL	1
IC511	PFVIMC78M05C	IC	1	L523	PQLQR1RM601	COIL	1
IC513	PFVIKM29N04T	IC	1	L524	PQLQR1ET	COIL	1
IC514	PFVIR10485	IC	1	L525	PQLQR2N2R7K	COIL	1
IC515	PQVINJM4558M	ic s	1				
IC516	PQVINJM4558M	IC S	1	R519	PQLQR1RM601	COIL	1
						(COMPONENTS PARTS)	
		(TRANSISTORS)		RA501~	EXRV8V271JV	COMPONENTS PARTS	1
Q503	POVTDTC114EU	TRANSISTOR(SI) [OR UN5211]	1	RA504			
Q505	PQVTDTC114EU	TRANSISTOR(SI) [OR UN5211]	1	RA505~	EXRV8V101JV	COMPONENTS PARTS	1
Q506	2SD1819A	TRANSISTOR(SI) S [OR 2SC4155 OR 2SC4081]	1	RA508			
Q507	2SB1197K	TRANSISTOR(SI) [OR 2SB1051K]	1			(CERAMIC FILTERS)	
Q508	2SD1819A	TRANSISTOR(SI) S [OR 2SC4155 OR 2SC4081]	1	LF501	EXCEMT222D	CERAMIC FILTER	1
Q509	2SB1197K	TRANSISTOR(SI) [OR 28B1051K]	1				
						(FUSE)	
Q510~512	2SD1819A	TRANSISTOR(SI) S [OR 2SC4155 OR 2SC4081]	3	F501	XBAPF001312	FUSE	1
Q513	2SB709A	TRANSISTOR(SI) [OR 2SB1051K OR 2SB1197K]	1			(CRYSTAL OSCILLATORS)	
Q514	2SB709A	TRANSISTOR(SI) [OR 2SB1051K OR 2SB1197K]	1	X501 X502	PFVCCFS32Z PFVCCSA24Z	CRYSTAL OSCILLATOR CRYSTAL OSCILLATOR	1 1
Q515	2SD1819A	TRANSISTOR(SI) S	1	X502	PFVC5376Z	CRYSTAL OSCILLATOR	1
LUCI I U	LOD IO ISA	THANGIOT OF I(OI)	' '	1,000	. , VOSO/OZ	STOTAL GOODLEATON	' '

Ref. No.	Part No.	Value	Pcs	Ref. No.	Part No.	Value		Pcs
L521	ERJ3GEY0R00	(RESISTORS)	1	R579	ERJ3GEYJ821	820		1
LOLI	LI NOCOLLI TOTTOO	ľ		R580	ERJ3GEYJ103	10K		1
R505	ERJ3GEYJ101	100	1	R581	ERJ3GEYJ472	4.7K		1
R506	ERJ3GEYJ101	100	1	R582	ERJ3GEYJ912	9.1K	i	1
R507	ERJ3GEYJ101	100	1	R583	ERJ3GEYJ223	22K		1
R508	ERJ3GEYJ271	270	1	R584	ERJ3GEYJ104	100K		1
R509	ERJ3GEYJ101	100	1	R585	ERJ3GEYJ104	100K		1
				R586	ERJ3GEYJ563	56K		1
R510	ERJ3GEYJ101	100	1 1	R587	ERJ3GEYJ104	100K		1
R511	ERJ3GEYJ223	22K	1	R588	ERJ3GEYJ472	4.7K	1	1
R512	ERJ3GEYJ823	82K	1	R589	ERJ3GEYJ103	10K		1
R515	ERJ3GEYJ102	1K	1				- 1	
R516	ERJ3GEYJ102	1K	1	R590	ERJ3GEYJ331	330		1
R517	ERJ3GEYJ101	100	1	R591	ERJ3GEYJ103	10K		1
R518	ERJ3GEYJ101	100	1	R592	ERJ3GEYJ103	10K		1
DEOD	ED IOOE)/ HOT	100		R593	ERJ3GEYJ103	10K		1
R520	ERJ3GEYJ101	100		R594	ERJ3GEYJ331	330		1
R521	ERJ3GEYJ101	100	1	R595	ERJ3GEYJ563	56K		1
R522	ERJ3GEYJ101	100	1 1	R596	ERJ3GEYJ562	5.6K		1
R525	ERJ3GEYJ562	5.6K 4.7K	1 1	R597 R598	PQ4R10XJ270 PQ4R10XJ330	27 33	S S	1
R526	ERJ3GEYJ472		1	R599	ERJ3GEYJ101	100	5	1
R527	ERJ3GEYJ203	20K	1 '	Loss	ENJOGETOTOT	100	- 1	'
R532	ERJ3GEYJ473	47K	1	R600	ERJ3GEYJ103	10K		1
R534	ERJ3GEYJ473	47K	1	R601	ERJ3GEYJ563	56K	l	1
R535	ERJ3GEY0R00	0	1	R602	ERJ3GEYJ563	56K		1
R537	ERJ3GEYJ103	10K	1	R603	ERJ3GEYJ332	3.3K		1
R539	ERJ3GEYJ472	4.7K	1	R604	ERJ3GEYJ103	10K	- 1	1
. 1000				R605	ERJ3GEYJ103	10K	ı	1
R540	ERJ3GEY0R00	О	1	R606	ERJ3GEYJ472	4.7K	- 1	1
R541	ERJ3GEYJ153	15K	1 1	R607	ERJ3GEYJ103	10K	ľ	1
R542	ERJ3GEYJ103	10K	1	R608	ERJ3GEYJ103	10K		1
R543	ERJ3GEY0R00	0	1 1	R609	ERJ3GEYJ393	39K	i	1
R544	ERJ3GEYJ472	4.7K	1					
R545	ERJ3GEY0R00	О	1	R610	ERJ3GEYJ393	39K		1
R547	ERJ3GEYJ271	270	1	R611	PQ4R18XJ150	15		1
R548	ERJ3GEYJ271	270	1	R612	ERJ3GEYJ393	39K		1
R549	ERJ3GEYJ271	270	1	R613	ERJ3GEYJ393	39K	ı	1
				R614	ERJ3GEYJ683	68K		1
R550	ERJ3GEY0R00	0	1	R615	ERJ3GEYJ103	10K		1
R551	ERJ3GEYJ101	100	1	R616	ERJ3GEY0R00	0		1
R552	ERJ3GEYJ472	4.7K	1	R617	ERJ3GEYJ683	68K		1
R553	ERJ3GEYJ101	100	1	R618	ERJ3GEYJ103	10K		1
R555	ERJ3GEYJ101	100	1	R619	ERJ3GEYJ472	4.7K		1
R556	ERJ3GEYJ101	100	1	Door	ED IOOES () CO	1016		
R557	ERJ3GEY0R00	0	1	R620	ERJ3GEYJ103	10K		1
R558	ERJ3GEYJ472	4.7K	1 1	R621	ERJ3GEYJ101	100		1
R559	ERJ3GEY0R00	0	1	R622	ERJ3GEYJ101	100		1
D#00	ED 10051/0555			R623	ERJ3GEYJ333	33K		1
R560	ERJ3GEY0R00	0	1	R624	ERJ3GEYJ472	4.7K		1
R561	ERJ3GEYJ101	100	1 1	R626	ERJ3GEYJ103	10K 10K		1
R562	ERJ3GEYJ101	100	1 1	R627	ERJ3GEYJ103	10K	l	1
R563	ERJ3GEYJ103	10K	1 1	R628 R629	ERJ3GEYJ101 ERJ8GEY0R00	0		1
R566	ERJ3GEYJ101	100	1	Luza	Endode i UNUU	ď	l	,
R567	ERJ3GEYJ101			R630	ERJ3GEYJ271	270	į	1
R568	ERJ3GEYJ101	100		R631	ERJ3GEYJ271	270		1
D570	ED ISCEVITAT	100	1	R632	ERJ3GEYJ271	270	1	1
R570	ERJ3GEYJ101			R633	ERJ3GEYJ271	270	į	1
R571	ERJ3GEYJ270	27 1M	1 1	R634	ERJ3GEYJ271	270	l	1
R572	ERJ3GEYJ105	1M		R635	ERJ3GEYJ271	270		1
R574	ERJ3GEYJ222	2.2K		R636	ERJ3GEYJ101	100	l	1
R575	ERJ3GEYJ122	1.2K		R638	ERJ3GEYJ184	180K		1
R576	ERJ3GEYJ221	220 4.7K	1	1000	E1100GE10104	TOOK		'
R577	ERJ3GEYJ472	4.7K	1 '	11	I			

Ref. No.	Part No.	Value	Pcs	Ref. No.	Part No.	Value		Pcs
R642	ERJ3GEY0R00	0	1	C567	ECUV1H120JCV	12P		1
R643	ERJ3GEYJ103	10K	1	C568	ECUV1H104ZFV	0.1	s	1
R644	PQ4R18XJ102	1K	1	C569	ECUV1H330JCV	33P		1
R645	ERJ3GEYJ103	10K	1					
R646	ERJ3GEYJ103	10K	1	C570	ECUV1H104ZFV	0.1	S	1
R647	ERJ3GEYJ103	10K	1	C571	ECUV1C224ZFV	0.22		1
				C572	ECUV1C224ZFV	0.22		1
				C573	ECUV1C224ZFV	0.22		1
				C574	ECUV1C224ZFV	0.22		1
				C576	ECUV1H104ZFV	0.1	S	1
		1		C578	ECUV1H333KDV	0.033	S	1
				C579	ECUV1H104ZFV	0.1	S	1
				C580	ECUV1H104ZFV	0.1	s	
				C581	ECUV1H472KBV	0.0047	S	
				C582	ECUV1H472KBV	0.0047	S	
		· ·		C583	PQCUV1H105JC	1	S	
				C584	PQCUV1H105JC	1	S	1
				C585	ECA1CM100	10		1
		(CAPACITORS)		C586	ECA1CM100	10		1
2503	ECUV1H561JCV	560P	1	C587	ECA0JM221	220		1
C507	PQCUV1H473MD	0.047	1	C588	ECA0JM101	100		1
				C589	ECUV1H104ZFV	0.1	S	1
0510 0512	ECUV1H222KBV ECUV1C104KBV	0.0022	1	C590	ECUV1H333KDV	0.033	s	1
C513	ECUV1H104ZFV	0.1	S 1	C591	ECA0JM221	220		1
C515	ECUV1H102KBV	0.001	1	C592	ECUV1H104ZFV	0.1	S	1
D516	ECUV1H102KBV	0.001	1	C593	ECUV1H104ZFV	0.1	S	1
30.0	2001111021121	1		C594	ECUV1H104ZFV	0.1	s	1
0521	ECUV1H102JCV	0.001	1	C595	ECUV1H030CCV	3P	s	1
C522	ECUV1H104ZFV	0.1	S 1	C596	ECA1VM470	47		1
C523	ECUV1H104ZFV	0.1	S 1	C597	ECUV1H080DCV	8P		1
C524	ECUV1H104ZFV	0.1	S 1	C598	ECUV1H102JCV	0.001		1
C525	ECUV1C224ZFV	0.22	1	1 0000			•	
C526	ECUV1H104ZFV	0.1	S 1	C600	PQCUV1C224KB	0.22	s	1
C527	ECUV1H104ZFV	0.1	S 1	C601	PQCUV1C224KB	0.22	s	
C528	ECUV1H104ZFV	0.1	S 1	C602	PQCUV1C224KB	0.22	S	
	1	0.1	S 1	C603	PQCUV1H105JC	1	S	
C529	ECUV1H104ZFV	0.1	١	C605	PQCUV1C224KB	0.22	S	
0500	ECTIVATIA OF TOX	12P	1	C606	PQCUV1C224KB	0.22	s	
C530	ECUV1H120JCV	0.1		C607	PQCUV1H104ZF	0.1	J	1
C532	ECUV1H104ZFV		S 1 S 1	C608	ECUV1H331JCV	330P	s	¦
C533	ECUV1H104ZFV	0.1	S 1	C609			3	1
C534	ECUV1H104ZFV	0.1		Coos	ECUV1E273KBV	0.027		'
C535	ECUV1H150JCV	15P	1	C611	ECLIVAC404KBV	0.1		l ,
C536	ECA0JM101	100	1	C611 C612	ECUV1C104KBV	0.1	s	1 1
C537	ECUV1H104ZFV	0.1	S 1		ECUV1H104ZFV		S	
C538	ECUV1H104ZFV	0.1	S 1	C614	ECUV1H104ZFV	0.1	5	ı
				C615	ECUV1C104KBV	0.1		1
C543	ECUV1H104ZFV	0.1	S 1	C618	ECUV1H102JCV	0.001		1
C544	ECUV1H104ZFV	0.1	S 1	C619	ECA0JM221	220		1
C545	ECUV1H104ZFV	0.1	S 1				_	١.
C546	ECUV1H104ZFV	0.1	S 1	C622	ECUV1H104ZFV	0.1	S	
C547	ECUV1H104ZFV	0.1	S 1	C623	PQCUV1H105JC	1	S	
C548	ECUV1H104ZFV	0.1	S 1	C624	PQCUV1H105JC	1	S	1
2549	ECA0JM101	100	1	C625	ECA1CM100	10		1
				C626	ECA1CM100	10		1
C550	ECUV1H104ZFV	0.1	S 1	C627	ECUV1H104ZFV	0.1	S	
C551	ECUV1H104ZFV	0.1	S 1	C628	ECUV1H104ZFV	0.1	S	
C552	ECUV1H104ZFV	0.1	S 1	C629	ECUV1H120JCV	12P		1
C553	ECUV1H104ZFV	0.1	S 1					
C554	ECUV1C104KBV	0.1	1	C632	ECUV1H104MD	0.1	S	1
C556	ECUV1H104ZFV	0.1	S 1					
C562	ECUV1H120JCV	12P	1					
0565	ECUV1H120JCV	12P	1					
C566	ECUV1H080DCV	8P	1	11				1

Ref. No.	Part No.	Part Name & Description	ı	Pcs	Ref. No.	Part No.	Part Name & Description & Value	Рс
	ANA	ALOG BOARD PARTS					(COILS)	-
					L101~104	PQLQR1RM601	COIL	4
CB2	PFLP1141MZ	ANALOG BOARD ASS'Y (RTL)	Δ	1	L105	PQLQR1E32A07	COIL	1
			ΔΔ		L106	PQLQR1E32A07	COIL	1
					L108~111	PQLQR2KA113T	COIL	
		1/10.3			4 1			4
	DO: 070 1000	(ICs)	٦		FLT101	PFLE003	COIL	1
2101	PQVITC4066BF	IC	S	1	[]			
C102	PQVINJM2113M	IC		1		,		1
2103	AN6382NFA	IC		1	H		(PHOTO COUPLERS)	1
C104	PFVINJM4558M	IC		1	PC101	0N3131SKU	PHOTO ELECTRIC TRANSDUCER	<u>A</u> 1
C105	PQVIMT3274AE	IC	s	1	PC102	0N3131SKU	PHOTO ELECTRIC TRANSDUCER	▲ 1
			- 1		PC103	PQVITLP627	PHOTO ELECTRIC TRANSDUCER	A
			- 1		PC104	PQVIPC814K	PHOTO ELECTRIC TRANSDUCER	<u>A</u>
			- 1				THE SECOND THE MEDICAL STATES	ZL .
		(TRANSISTORS)	١					
105	2SC2235	TRANSISTOR(SI)	- 1	4				1
				1	1		TRANSFORMERS)	
2106	2SD2136	TRANSISTOR(SI)		1	1		(TRANSFORMERS)	
2107	2SD1819A	TRANSISTOR(SI)	S	1	T101	PQLT8E7A	TRANSFORMER	∆ ∆ 1
		[OR 2SC4155 OR 2SC4081]			T102	PQLT8E6A	TRANSFORMER	∧ 1
2108	2SD1921Q	TRANSISTOR(SI) [OR 2SD1994A]		1				1
2109	2SA1627	TRANSISTOR(SI)		1				1
110	PQVTDTC143E	TRANSISTOR(SI) [OR UN521]		1				1
							(VARISTORS)	1
					SA101	PQVDDSS301L	VARISTOR	1
			- 1		SA102	PFVDRA102M	VARISTOR	1
	4	(510550)	- 1					
		(DIODES)			ZNR101	ERZVA7D121	VARISTOR	1
104	MA4056	DIODE(SI)	- 1	1				1
107	PQVDHZS2B1	DIODE(SI)	- 1	1				l
108	MA4056	DIODE(SI)	- 1	1		i		l
109	1SS119	DIODE(SI)	- [1 .			(COMPONENTS PARTS)	l
					L107	EXCELDR35	COMPONENTS PARTS	1 1
110	1SS119	DIODE(SI)		1	-			'
0111	1SS119	DIODE(SI)		1				i
112	188119	DIODE(SI)	- 1	1				
0114	1SS119		- [1			(TUEDMICTOD)	
		DIODE(SI)	- 1		200101	DEDTOOR	(THERMISTOR)	١.
115	PQVDS1ZB40F1	DIODE(SI)	- 1	1	POS101	PFRT002	THERMISTOR	1
116	1SS119	DIODE(SI)		1		ì		1
118	1SS119	DIODE(SI)	- 1	1				
			- 1		1			
							(RESISTORS)	
					D117	ERDS2TJ560	56	1 1
		(CONNECTORS & JACKS)		1				
N101	PQJS12A10Z	CONNECTOR, 12 PIN		1	L112	ERJ3GEY0R00	0	1
N102			- 1					I '
	PQJS12A10Z	CONNECTOR, 12 PIN		1	L113	ERJ3GEY0R00	0	1
N103	PQJS07A10Z	CONNECTOR, 7 PIN		1	L	ED 100EVODO		L
N104	PQJP2G30Z	CONNECTOR, 2 PIN		1	J1	ERJ3GEY0R00	0	1
N105	PQJP02G100Z	CONNECTOR, 2 PIN		1	J2	ERJ3GEY0R00	0	1
N106	PFJP02A06Z	CONNECTOR, 2 PIN		1	JJ115	ERJ3GEY0R00	0	1
		1					1	
N107	PQJJ1TB18Z	JACK		1	R101	ERJ3GEYJ103	10K	1
N108	PFJJ1T01Z	JACK		1	R102	ERJ3GEYJ103	10K	1
_					R103	ERJ3GEYJ224	220K	1
		1		- 1	R104	ERJ3GEYJ224	220K	1
		1			R105	ERJ3GEYJ224	220K	1
		COMITCH		ĺ	R106		B	
	DE0111	(SWITCH)		_		ERJ3GEYJ224	220K	1
W101	PFSH1A02Z	SWITCH		1	R107	ERJ3GEYJ122	1.2K	1
					R108	ERJ3GEYJ472	4.7K	1
								l
					R110	ERJ3GEYJ562	5.6K	1
		(CERAMIC FILTER)			R113	ERJ3GEYJ102	1K	1
101	PQVBT4.19G2	CERAMIC FILTER		1	R114	ERJ3GEYJ472	4.7K	1
101	UVD14.1802	OE IAMIO FIETER		'	R116		15K	'
		1	1		D 1 10	ERJ3GEYJ153	TOIX	Ι '
		1						
					R123	ERJ3GEYJ103	10K	1
		1			R125	ERJ3GEYJ103	10K	1
	1	i	- 1		R129	ERJ3GEY0R00	0	1 1

Dof N-	Dod No.	Value		Pcs	Ref. No.	Part No.	Value		Pcs
Ref. No.	Part No.	value		F 03	1101. 110.			4	
R134	ERDS2TJ4R7	4.7		1	R203	ERJ3GEYJ104	100K		1
R136	ERJ3GEYJ104	100K		1	R204	ERJ3GEYJ822	8.2K	- [1
R139	ERJ3GEYJ114	110K		1	R205	ERJ3GEYJ222	2.2K	١	1
			- 1		R206	ERJ3GEYJ222	2.2K		1
R140	ERJ3GEYJ562	5.6K	- 1	1	R207	PQ4R10XJ103	10K	S	1
3141	ERJ3GEYJ114	110K	ı	1	R208	ERJ3GEYJ103	10K		1
R142	ERJ3GEYJ103	10K		1	R209	ERJ3GEYJ103	10K	- 1	'
R144	ERJ3GEYJ563	56K		1	D010	ED INCEVITOR	10K		1
R145	ERJ3GEYJ563	56K		1	R210 R211	ERJ3GEYJ103 ERJ3GEYJ103	10K	- 1	1
R146	ERJ3GEYJ333	33K		1	R212	ERDS2TJ472	4.7K		1
R147	ERJ3GEYJ333	33K 10K	- 1	1	R213	ERJ3GEYJ103	10K	ı	1
R149	ERJ3GEYJ103	ION		•	R214	ERJ3GEYJ104	100K		- 1
D150	ED IOCEV ISSS	22K	- 1	1	R215	ERJ3GEYJ182	1.8K		1
R150	ERJ3GEYJ223	33K	- 1	1	R216	ERJ3GEYJ222	2.2K	- 1	1
R151	ERJ3GEYJ333	68K		1	R217	ERJ3GEYJ153	15K	- 1	1
R152	ERJ3GEYJ683			1	R218	ERJ3GEYJ153	15K	1	1
R156	ERJ3GEYJ124	120K 22K		1	R219	ERJ3GEYJ100	10		1
R157	ERJ3GEYJ223	150K		1	1.210			-	
R158 R159	ERJ3GEYJ154 ERJ3GEYJ103	10K		1	R220	ERJ3GEYJ103	10K		1
11109	LINGGETOTOS	197		·	R221	ERJ3GEYJ152	1.5K		1
R160	ERJ3GEYJ183	18K		1	R222	ERJ3GEYJ472	4.7K		1
R161	ERJ3GEYJ124	120K		1	R223	ERG2SJ681	680	- [1
R162	ERJ3GEYJ123	12K		1	R224	ERJ3GEYJ471	470	- 1	1
R163	ERJ3GEYJ102	1K		1	R225	ERJ3GEYJ152	1.5K	- 1	1
R164	ERJ3GEYJ273	27K		1	R226	ERJ3GEYJ223	22K		1
R165	ERJ3GEYJ562	5.6K		1	R227	ERJ3GEYJ101	100	- 1	-1
R166	ERJ3GEYJ104	100K		1	R228	ERJ3GEYJ102	1K		1
R167	ERJ3GEYJ101	100		1	R229	ERDS1TJ473	47K	S	1
R168	ERJ3GEYJ101	100		1				-1	
R169	ERJ3GEYJ101	100		1	R230	ERJ3GEYJ101	100	-1	1
				10	R231	ERDS1TJ473	47K	S	1
R170	ERJ3GEYJ472	4.7K		1	R234	ERJ3GEYJ333	33K		1
R171	ERJ3GEYJ223	22K		1	R236	ERJ3GEYJ103	10K		1
R172	ERJ3GEYJ332	3.3K		1	R238	ERJ3GEYJ103	10K	- 1	1
R173	ERJ3GEYJ272	2.7K		1					
R174	ERJ3GEYJ152	1.5K		1	R241	ERG1SJ122	1.2K		1
R175	ERJ3GEYJ104	100K		1					
R176	ERJ3GEYJ562	5.6K		1				- 1	
R177	ERJ3GEYJ334	330K	- 1	1	1				
R178	ERJ3GEYJ121	120		1		1			
R179	ERJ3GEY0R00	0		1					
R180	ERJ3GEYJ562	5.6K		1					
R182	ERJ3GEYJ123	12K		1			(CAPACITORS)	- [
R183	PQ4R10XJ391	390	S	1	C101	ECA0JM101	100	- 1	1
R185	ERDS2TJ5R6	5.6		1	C102	PQCUV1C224KB	0.22		1
R186	ERJ3GEYJ334	330K	- 1	1	C103	ECUV1C104KBV	0.1	1	1
R187	ERJ3GEYJ473	47K		1	C104	ECEA1HU4R7	4.7		1
R188	ERJ3GEYJ153	15K		1	C105	PQCUV1C224KB	0.22	J	1
R189	ERJ3GEYJ273	27K		1	C106	ECUV1C104KBV	0.1		1
R190	PQ4R10XJ000	o		1	C111	PQCUV1H105JC	1	s	1
R191	ERJ3GEYJ561	560		1	C112	PQCUV1H105JC	1	S	1
R192	PQ4R10XJ822	8.2K	s	1	C114	ECUV1H102KBV	0.001		1
R193	ERJ3GEYJ105	1M		1	C118	ECUV1H103KBV	0.01		1
R194	ERJ3GEYJ683	68K		1					
R195	ERJ3GEYJ682	6.8K		1	C120	ECA0JM101	100		1
R196	ERJ3GEYJ224	220K		1	C123	ECUV1H103KBV	0.01		1
R197	ERJ3GEYJ333	33K		1	C126	ECEA1HKS100	10	s	1
R198	ERJ3GEYJ334	330K	- 1	1	C127	PQCUV1H104ZF	0.1		1
R199	ERJ3GEYJ104	100K		1	C128	ECUV1H181JCV	180P		1
R200	ERJ3GEYJ393	39K		1	C129	ECUV1H123KBV	0.012		1
R200 R201	ERJ3GEYJ393 ERJ3GEYJ103	10K		1	C130	ECUV1H181JCV	180P		1
R202	ERJ3GEYJ104	100K		1	C131	ECUV1C104KBV	0.1		1

Ref. No.	Part No.	Value		Pcs	Ref. No.	Part No.	Value	Pcs
C132	ECUV1C104KBV	0.1		1	C202	ECUV1H472KBV	0.0047	1
C134	ECUV1C683KBV	0.068		1	C203	ECUV1H103KBV	0.01	1 1
C135	ECUV1H223KBV	0.022	S	1	C204	ECUV1C104KBV	0.1	1 1
C136	ECUV1H333KDV	0.033	S	1	C205	PQCUV1H105JC	1	S 1
C137	ECUV1H223KBV	0.022	5	1	C206 C207	ECEA1HKS100	10 0.047	S 1
C138	ECUV1C104KBV	0.1		1	C207	ECUV1C473KBV ECUV1H182KBV	0.0018	1 ;
C140	ECUV1C104KBV	0.1		1	C209	PQCUV1H104ZF	0.1	1 1
C142	ECUV1H223KBV	0.022	s	1	0200	40071110-121	0.1	
C145	ECUV1H682KBV	0.0068	Ĭ	1	C210	ECA0JM101	100	1 1
C146	ECUV1H272KBV	0.0027		1	C211	ECUV1H333KDV	0.033	S 1
C147	ECUV1H101JCV	100P		1	C212	ECUV1H333KDV	0.033	S 1
C148	ECUV1H222KBV	0.0022		1	C213	PQCUV1H104ZF	0.1	1
C149	ECEA1CK101	100	s	1	C214	ECEA1HKS2R2	2.2	S 1
					C215	ECKD2H681KB	680P	S 1
C150	ECUV1H821KBV	820P		1	C216	ECKD2H681KB	680P	S 1
C151	ECUV1H561JCV	560P	s	1	C217	ECEA1HKS010	1	S 1
C152	ECEA1HKS4R7	4.7	s	1	C218	ECEA1CKS470	47	S 1
C153	ECUV1C683KBV	0.068		1	C219	ECUV1C104KBV	0.1	S 1
C154	ECUV1C104KBV	0.1	s	1				ŀ
C155	PQCUV1H105JC	1	S	1	C220	ECUV1H103KBV	0.01	1
C156	ECUV1H102KBV	0.001		1	C221	ECUV1H103KBV	0.01	1
C157	ECEA1CK101	100	S	1	C222	ECUV1H103KBV	0.01	1
C158	ECUV1H103KBV	0.01		1	C223	ECEA0JKS220	22	S 1
C159	ECUV1C104KBV	0.1	S	1	C224	ECUV1H103KBV	0.01	S 1
0400	EDEA41 (1400	100	- 1		C225	ECUV1H332KBV	0.0033	1
C160	ECEA1HU100	10 100	- 1	1	C226 C227	ECQE2E334KZ ECUV1H103KBV	0.33 0.01	S 1 S 1
C161	ECA0JM101	0.1	s	1	0221	ECOVITIONOV	0.01	,
C162 C163	ECUV1C104KBV ECUV1H681KBV	680P	٦	1				ł
C164	ECUV1H681KBV	680P	- 1	1				
C165	ECEA1HKS4R7	4.7	s	1			1	
C166	ECUV1H392KBV	0.0039	-	1				1
C167	ECUV1H681KBV	680P	ı	1				
C168	ECEA1EKS330	33	s	1	1	ļ		
C169	ECUV1H101JCV	100P	-	1			1	
C172	ECUV1C104KBV	0.1	s	1				l
C173	ECUV1C104KBV	0.1		1				ı
C175	ECEA1HKS100	10	S	1			1	ı
C176	ECUV1H333KDV	0.033	S	1				1
C178	ECUV1C104KBV	0.1	_	1	1	ļ		
C179	ECUV1C104KBV	0,1	s	١.				
C180	ECUV1H153KBV	0.015		1				
C180	ECUV1H331JCV	330P	s	1			1	
C183	ECUV1C104KBV	0.1	s	1			1	
C184	ECUV1C104KBV	0.1		1		1		
C185	ECEA1HKS100	10	s	1				
C186	ECA0JM101	100		1				
C187	ECA0JM101	100		1			1	
C188	ECUV1C104KBV	0.1	s	1]		
C189	ECUV1H183KBV	0.018		1				
							1	
C190	ECEA1HKS100	10	S	1				
C191	ECUV1H821KBV	820P		1				1
C192	ECEA1CU221	220		1				
C193	ECUV1H271KBV	270P		1				
C194	ECUV1C104KBV	0.1	S	1		1		
C195	ECUV1C104KBV	0.1		1 1				
C196	ECEA1HU100	10		1		1		
C197	ECUV1H821KBV	820P		1				
C198	ECUV1H680JCV	68P 100		1				
C199	ECA0JM101	1000		'	1			
					1 1			

Ref. No.	Part No.	Part Name & Description & Value	Pcs	Ref. No.	Part No.	Part Name & Description & Value	Pc
	OPER	ATION BOARD BARTS		R381	ERJ3GEYJ563	56K	1
	OPER	ATION BOARD PARTS		R382	ERJ3GEYJ331	330	;
2000	DEL DATOCHEZ	ODEDATION DOADD ACCIV (DTL)	1	R383	ERJ3GEYJ331	330	;
CB3	PFLP1136MZ	OPERATION BOARD ASS'Y (RTL)	' '	R384		330	
					ERJ3GEYJ331		;
	ŀ	140		R385	ERJ3GEYJ101	100	'
		(IC)		l pooc	ED IOOEVODOO		١.,
C301	MN53007QAF	IC	1	R392	ERJ3GEY0R00	0	1
				R396 R397	ERJ3GEYJ102	1K 1K	1 1
		(DIODEC)	1	H397	ERJ3GEYJ102	IK.	l '
2000	100110	(DIODES)					
0363	1SS119	DIODE(SI) S DIODE(SI) S		11	i		
D364	1SS119			11	}	(CAPACITORS)	
.ED301~	PQVDR325CA47	LED	1.3	1	FOLIVACIOAKEN	,	۔ ا
LED303	1			C301	ECUV1C104KBV	0.1 \$	
	Ì			C302	ECEA1AKS101	100	1
		/		C305	ECUV1H122KBV	0.0012	1
		(CONNECTORS)		C307	ECUV1H331JCV	330P	1
N301	PQJP11G43Y	CONNECTOR, 11 PIN	1	C309	ECUV1H331JCV	330P	1
N302	PQJS10X59Z	CONNECTOR, 10 PIN	1		E01114110041004	222	١.
				C310	ECUV1H331JCV	330P	1
					FOUNDACTORIES		١.
	1	(OMITOLIES)		C322	ECUV1C104KBV	0.1 S	1
		(SWITCHES)			EOL 11/4 O 4 O 4 O 4 O 1/4 O 1		١.,
SW301~	EVQ11Y05B	SWITCH S	37	C331	ECUV1C104KBV	0.1 S	
SW337	l .	CANTE L		C332	ECUV1C104KBV	0.1 S	1
W350	EVQVEHF1712B	SWITCH	1	l loors	EOL 11/4/O40 4/5/E/1		L
			1	C351	ECUV1C104KBV	0.1	
				C352	ECUV1C104KBV	0.1 S	1
	l		l	11		1	Ι.
		(PHOTO COUPLERS)		C363	ECUV1C104KBV	0.1 S	1
PI301~	CNA1006N	PHOTO ELECTRIC TRANSDUCER S	3	C364	ECUV1C104KBV	0.1	1
PI303			1	C365	ECUV1C104KBV	0.1 S	1
			1	C366	PQCUV1H331JC	330P	1
			1	11			
		(RESISTORS)		11	i		
R307	ERJ3GEYJ181	180	1	I	1		L
308	ERJ3GEYJ181	180	1		POWER	SUPPLY BOARD PARTS	
309	ERJ3GEYJ181	180	1		7	T	
			l .	PCB4	PFLP1131MZL	POWER SUPPLY BOARD ASS'Y	1
R310	ERJ3GEYJ101	100	1	11		<u></u> Δ(RTL)	
311	ERJ3GEYJ181	180	1	11	1		l
1312	ERJ3GEYJ181	180	1	i i			
						(ICs)	
1322	ERJ3GEYJ102	1K	1	IC101	PFVIFA5317P	IC	1
1323	ERJ3GEYJ273	27K	1	IC201	AN1431T	IC	1
1332	ERJ3GEYJ471	470	1				l
3333	ERJ3GEYJ471	470	1	11	1	(TRANSISTOR)	l
R334	ERJ3GEYJ471	470	1	Q101	PQVTFS10KM10	TRANSISTOR(SI)	1
R341	ERJ3GEYJ181	180	1	11			
R342	ERJ3GEYJ181	180	1	11			
1343	ERJ3GEYJ181	180	1			(DIODES)	l
344	ERJ3GEYJ181	180	1	D101	PFVD1N4005	DIODE(SI)	1
345	ERJ3GEYJ181	180	1	D102	PFVD1N4005	DIODE(SI)	1
346	ERJ3GEYJ181	180	1	D103	PFVD1N4005	DIODE(SI)	1
347	ERJ3GEYJ181	180	1	D104	PFVD1N4005	DIODE(SI)	1
348	ERJ3GEYJ181	180	1	D105	PFVDAG01A	DIODE(SI)	-
		1000		D106	188119	DIODE(SI)	
361	ERJ3GEYJ181	180	1	D107	MA4220	DIODE(SI)	
362	ERJ3GEYJ181	180	1	D108	PQVDERA1802	DIODE(SI)	
	ERJ3GEYJ103	10K	1	11	2.22.011002		
363	1	10K	1				
				11	1	i .	ı
R363 R364	ERJ3GEYJ103	T (V (V)		D201	DEVIDEEL COOL	DIODE(SI)	
	ERJ3GEYJ103 ERJ3GEYJ103 ERJ3GEYJ181	10K 10K 180	1	D201 D202	PFVDSF5LC20U PFVDD1NL20U	DIODE(SI) DIODE(SI)	

This rep	placement part	s list is for KX-FP270 o	nly.	Refer to	the simplified ma	nual (cover) for other areas.	
Ref. No.	Part No.	Part Name & Description & Valu	e Pcs	Ref. No.	Part No.	Part Name & Description & Value	Pcs
		(CONNECTORS)		R223	PQ4R10XJ101	100	1
CN31	PQJP2D98Z	CONNECTOR, 2 PIN	1	R224	PQ4R10XJ273	27K	1
CN301	PQJP6G100Z	CONNECTOR, 6 PIN	1	R225	PQ4R10XJ332	3.3K	1
		(FUSES)					
F101	PQBA1C50NBKL	FUSE	1				
F201	PFBA19372	FUSE	1		,		
		(COILS)					
L101	ELF15N010A	1	<u>f</u> 1				
L201	PQLE53	COIL	1	11		(CAPACITORS)	
				C101 C102	ECQU2A224MG	0.22	1
İ		(PHOTO COUPLERS)		C102	ECQU2A473MG PFKDE2GA222M	0.047	1
PC101	0N3131S	PHOTO ELECTRIC TRANSDUCER	R A 1	C104	PFKDE2GA222M	0.0022	1 1
	1			C105	PFKDE2GA472M	0.0022	1
				C106	EEUEB2D181U	180.	1
			1	C108	ECKD3A102KBP	0.001	1.
L103	EXCELDR35	(COMPONENTS PARTS) COMPONENTS PARTS	1	C109	ECA1VHG470	47	1
				C119	ECKD3A221KBP	220P	1
				C121	ECUV1H472KBN	0.0047	1
		(TRANSFORMER)		C122	ECUV1C224KBX	0.22	1
T101	ETS29AZ1X5AC	TRANSFORMER 2	1	C123	ECUV1H471JCX	470P	1
				C124	ECUV1H104KBW	0.1	1
		(VARIABLE RESISTOR)		C201	EEUFA1V471	470	1
VR201	EVNDJAA03B53	VARIABLE RESISTOR	1	C202	ECKD3A102KBP	0.001	1
-	ĺ			C203 C205	PFCEA16B470 ECQV1H474JL	47P 0.47	1
		(VARISTOR)				•	
ZNR101	ERZV10DK471U	VARISTOR 2	1	C222	ECUV1H104KBX	0.1	1
				C223	ECUV1H104KBW	0.1	1
		(RESISTORS)					
R101	ERDS2TJ105	1M A	1		CC	D BOARD PARTS	
R102	ERDS2TJ393	39K	1	1			
R103	ERDS2TJ393	39K	1	PCB5	PFWP2FP200M	CCD BOARD ASS'Y (RTL)	1
R104	ERG1SJ473P	47K	1				1
R105	ERX2SJR22	0.22	1 1			(100)	1
R106 R107	ERG2SJ101 PQ4R10XJ680	100 68	1 1	IC801	PFWP2FP200M	(ICs) CCD BOARD ASS'Y (RTL)	1
R108	ERDS2FJ150	15	1	10001	11 11 21 20010	COD BOATIS AGO T (TTE)	. 1
R109	ERDS2FJ220	22	1			(TRANCISTORS)	
R121	ERDS2TJ103	10K	1	Q801 .802	2SB1218A	(TRANSISTORS) TRANSISTOR(SI) [OR 2SA1576R] S	2
R122	PQ4R10XJ561	560	1	Q803	2SD1819A	TRANSISTOR(SI) [OR 2SC4155S] S	1
R123	PQ4R10XJ561	560	1				1
R124	PQ4R10XJ181	180	1			1	
R125	PQ4R10XJ103	10K	1			(CONNECTOR)	
	PQ4R10XJ562	5.6K	1	CN801	PQJP8G30Y	CONNECTOR, 8P	1
R127	PQ4R10XJ102	1K	1 1				
R128 R129	PQ4R10XJ100 PQ4R10XJ104	10 100K	1				
11123	GALLIOVA 104		'			(CAPACITORS)	
R130	PQ4R10XJ104	100K	1	C801	PQCUV1E104MD	0.1 S	1
R131	PQ4R10XJ823	82K	1	C803 C804	ECEA1CKS101 PQCUV1E104MD	100 0.1 S	1
R203	ERDS2TJ332	3.3K	1				
R205	ERG1SJ222	2.2K	1				ĺ
R221	PQ4R10XJ222	2.2K	1				
R222	PQ4R10XJ222	2.2K	1	J L			

	Ref. No.	Part No.	Part Name & Description & Value	9	Pcs	Ref. No.	Part No.	Part Name & Description & Value	Pc
POLYBRA12003 CAPACITORS C			(RESISTORS)	7				I' '	-
201,902 POARTIOXJO202 201 20	801	PQ4R18XJ000	0			F401	PQBA1N025NMA	FUSE	1
DOAH10X.100	302,803	PQ4R10XJ000	0	S	2			1	
POAHTINEARY 2 24K S 1	801,802	PQ4R10XJ202	2K	S	2				
POARTION_2012 2.4K S 1 R401 REDISTURE1 REDISTURE1 REDISTURE1 REDISTURE1 REDISTURE1 REDISTURE1 REDISTURE2 REDISTURE1 REDISTURE2 REDISTURE1 REDISTURE2 REDISTURE1 REDISTURE2 REDISTURE1 REDISTURE2 REDISTURE1 REDISTURE2 REDISTURE1 REDISTURE2 REDISTURE2 REDISTURE1 REDISTURE2 REDISTURE1 REDISTURE2 REDI	1803	PQ4R10XJ100	10	s	1				
POMPIGNAZIZE 2.7K S 1 R401 ERDSZTJASZ 3.3K R402 ERDSZTJASZ 3.3K R402 ERDSZTJASZ 3.3K R403 ERDSZTJASZ 3.3K R404 ERDSZTJASZ 3.3K R404 ERDSZTJASZ 3.3K R405 ERDSZTJASZ 3.3K R405 ERDSZTJASZ 3.3K R405 ERDSZTJASZ ERTENSION CORD, 2 PIN ERTENSION C			2.4K		1			(RESISTORS)	
POWER DOWN CONNECTORS POWER					1	R401	ERDS2TJ821	820	1
POARTIOXAZ71							The state of the s		1
PORTIONARY A70 S 2 No.									1
POARTIOX,IEST 830									1
None						N404	END3213332	0.0K	
POARTOXJO00 POARTOXJO00 POARTS POARTOXJO00 POART		1		- 1					
CADI EVNDXAA03B23 SEMI-FIXED RESISTOR)	3811,812	PQ4R10XJ101	100	S					
NAM	R830	PQ4R10XJ000	0	s	1	C401	ECEA1VKA330		1
TRB01				1		C401	ECEATVRAZZU	22	'
HOOK SWITCH AND SENSOR BOARD PARTS EC 2 POZZZKIGZ EXTENSION CORD, 2 PIN EXTENSION CORD, 2 PIN EXTENSION CORD, 2 PIN EXTENSION CORD, 2 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 3 PIN EXTENSION CORD, 5 PIN EXTENSION CORD, 5 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 7 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 9 PIN EXTENSION CORD, 9 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 8 PIN EXTENSION CORD, 9 PI			(VARIABLE RESISTOR)	- 1					
HOOK SWITCH AND SENSOR BOARD PARTS	/R801	EVNDXAA03B23	SEMI-FIXED RESISTOR, 2K	-	1			*	
HOOK SWITCH AND SENSOR BOARD PARTS				-					
PRIPITION POWER PRIPITION POWER POWE							Fi	XTURES AND TOOS	
PFLP1130MZ		HOOK SWITCH	AND SENSOR BOARD PARTS	_1		EC 1	PQZZ2K6Z	EXTENSION CORD, 2 PIN	1
PFLP1130MZ		noon onno	.,			1 1		EXTENSION CORD. 2 PIN	2
(MTL) (ICS) (I	OCDC.	DEL D1120M7	HOOK SWISENSON BOARD ASS	vΤ	1				1
C401	CB6	PPLPTISUNZ		- 1					1
Cd01			(HIL)	'		1			1
C401				ı		1 1			
PQVIBA12003 CC			(ICs)						1
Convert Conv	C401	PQVIBA12003	IC		1	EC 7	PFZZ5K13Z		2
Convectors Con	C402	PQVIBA12003	IC	s	1	EC 8	PQZZ12K4Z	EXTENSION CORD, 12 PIN	1
CAMO1 28B1322 TRANSISTOR(SI) [OR 28B1237] S 1 EC12 PQZZ9K4Z EXTENSION CORD, 9 PIN EXTENSION CORD, 6 PIN EXTENSION CORD, 12 PIN EXTENSION CORD, 1				l		EC 9	PQZZ6K14Z	EXTENSION CORD, 6 PIN	1
Characteristics Characteri				- 1		EC10	PQZZ8K18Z	EXTENSION CORD, 8 PIN	1
DA01			(TRANSISTORS)	- 1				EXTENSION CORD. 9 PIN	1
DA01	0.404	0004000		٥	4				1
DA01				- 1					;
DA01	Q402	2SB1322	[TRANSISTOR(SI) [OR 25B1237]	٥	'		1		1 ,
DA01				- 1		1			1
DA01						EC16	PFZZ7K15Z	EXTENSION CORD, 7 PIN	1
D401			(DIODES)			11			
DA02	D401	188147			1	H	1		
D403 1SS147 DIODE(SI) 1 D404 MA7200 DIODE(SI) S 1 D406 1SS147 DIODE(SI) S 1 D406 1SS147 DIODE(SI) S 1 D406 1SS147 DIODE(SI) S 1 D406 1SS147 DIODE(SI) S 1 D406 1SS147 DIODE(SI) S 1 D406 1SS147 DIODE(SI) SENSOR BOARD TOOL (See P.125 SPECIAL ROM TOOL (See P.125 SPECIAL ROM TOOL (See P.125 SPECIAL ROM TOOL (See P.75) CN401 PQJP5G30Y CONNECTOR, 5 PIN 1 CN402 PQJP9G30Y CONNECTOR, 9 PIN 1 CN403 PQJP06G100 CONNECTOR, 6 PIN 1 CN404 PQJP5G30Y CONNECTOR, 2 PIN 1 CN405 PQJP5G30Y CONNECTOR, 5 PIN 1 CN406 PQJP3G30Y CONNECTOR, 5 PIN 1 CN406 PQJP3G30Y CONNECTOR, 3 PIN 1 CN407 PQJP3G30Y CONNECTOR, 3 PIN 1 CN408 PQJP3G30Y CONNECTOR, 3 PIN 1 CN408 PQJP3G38Z CONNECTOR, 3 PIN 1 SW401 ESE14A211 SWITCH 1 SWITCH 1 CSWITCH 1 COL (See P.114) TOOL (See P.114) PFZZ1F780M PPZZ1F780M SENSOR BOARD TOOL (See P.125 SPECIAL ROM TOOL				s		11	PE772FP200M	SEPARATION SPRING HEIGHT	1
DA04 MA7200 DIODE(SI)				Ĭ		H			
D405 1SS147 DIODE(SI) 1 1 PFZZFP200M SENSOR BOARD TOOL (See P.125)				٦			DE771 E700M		1
DA06				9		H			1
CONNECTORS CONNECTORS CONNECTOR, 5 PIN 1 CONNECTOR, 3 PIN	D405					11			
(CONNECTORS) (CN401 PQJP5G30Y CONNECTOR, 5 PIN 1 CONNECTOR, 9 PIN 1 CONNECTOR, 6 PIN 1 CONNECTOR, 2 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 3 PIN 1 CO	D406	1SS147	DIODE(SI)		1		PFZZFP270M	SPECIAL ROM TOOL (See P.75)	1
CONNECTORS CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 6 PIN 1 CONNECTOR, 6 PIN 1 CONNECTOR, 6 PIN 1 CONNECTOR, 2 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 3 PIN CONNE									
CN401 PQJP5G30Y CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 9 PIN 1 CONNECTOR, 6 PIN 1 CONNECTOR, 2 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 3 PIN		1				ll			
PQJP9G30Y		ì	(CONNECTORS)	ı		11			n
CN402 PQJP9G30Y CONNECTOR, 9 PIN 1 CONNECTOR, 6 PIN 1 CONNECTOR, 6 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 3 PIN	CN401	PQJP5G30Y	CONNECTOR, 5 PIN		1	11		Cords (Ref. No. EC2, EC10) are	
CN403 PQJP06G100 PQJP02G100Z PQJP5G30Y CN406 PQJP03G100Z CN407 PQJP3G30Y CN408 PQJP3G38Z CN408 PQJP3G38Z CN401 ESE14A211 CONNECTOR, 6 PIN 1 CONNECTOR, 2 PIN 1 CONNECTOR, 5 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN 1						11		necessites for servicing.	I
CN404 PQJP02G100Z PQJP5G30Y PQJP5G30Y PQJP03G100Z PQJP3G30Y PQJP3G30Y PQJP3G30Y PQJP3G30Y PQJP3G30Y PQJP3G30Y PQJP3G30Y PQJP3G38Z PDJP3G38Z PDJP3G						11	1		
CN405 PQJP5G30Y CONNECTOR, 5 PIN 1 Servicing. (They make servicing easy.) CN406 PQJP3G30OY CONNECTOR, 3 PIN 1 CONNECTOR, 3 PIN			i i			П			1
CN406 PQJP03G100Z CONNECTOR, 3 PIN 1 (They make servicing easy.) CN407 PQJP3G30Y CONNECTOR, 3 PIN 1 (CN408 PQJP3G38Z CONNECTOR, 3 PIN 1 (SWITCH) SW401 ESE14A211 SWITCH 1				1		11	1		I
CN407 PQJP3G30Y CONNECTOR, 3 PIN 1 1 CN408 PQJP3G38Z CONNECTOR, 3 PIN 1 1 (SWITCH) SW401 ESE14A211 SWITCH 1	CN405				1	11	1		l
CN408	CN406	PQJP03G100Z	CONNECTOR, 3 PIN		1	H		(They make servicing easy.)	ĺ
CN408 PQJP3G38Z CONNECTOR, 3 PIN 1 (SWITCH) SW401 ESE14A211 SWITCH 1	CN407	PQJP3G30Y	CONNECTOR, 3 PIN		1	H	1		
SW401 ESE14A211 SWITCH 1					1				
SW401 ESE14A211 SWITCH 1									
SW401 ESE14A211 SWITCH 1						П			
SW401 ESE14A211 SWITCH 1			(SWITCH)						1
(PHOTO COLIPLERS)	SW401	ESE14A211	18		1				
(PHOTO COURLERS)						<u> </u>			
I I/PHOTO COURLERS)									
			(PHOTO COUPLERS)			1			
PI402 CNA1006N PHOTO ELECTRIC TRANSDUCER S 1 PI403 PQVIPS4506 PHOTO ELECTRIC TRANSDUCER S 1	PI402	CNA1006N							